Traffic Engineering

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Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

COVER: The Port of New York Authority's Union Motor Truck Terminal, officially dedicated on October 31, 1949.

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LETTERS TO THE EDITORS

DARK STREETS ARE DANGEROUS

We are very much interested in an article in "Traffic Engineering", September 1949 (p. 570).

This article refers to results given by the Street and Traffic Safety Lighting Bureau of the effect on accidents of adequate street lighting.

We would be grateful if you could send us particulars of the roads concerned, the change in the lighting system and the relative figures for accidents.

W. H. GRANVILLE
Dir. of Rd. Res.
Road Research Laboratory
Harmondsworth, Middlesex, England

● Additional information was reported on p. 85 of the November (1949) issue. Further details may be obtained by directing inquiries to The Street and Traffic Safety Lighting Bureau, 1410 Terminal Tower, Cleveland 13, Ohio.—ED.

OUR TRAFFIC LIGHTS

As a regular reader of "Traffic Engineering" I feel that I must comment on the above article (by Ronald Syme) which appeared in your November 1949 issue (p. 82). The impression conveyed by your correspondent is that in Britain the erection of traffic signals and signs is a completely haphazard process. This is far from being the case. In fact, if any criticism is to be levelled at the procedure in connection with traffic engineering in England, it is that it is too centralized and coordinated and so tends to give insufficient scope to local initiative. No traffic signals can be erected without the prior approval of the Ministry of Transport who in normal circumstances pay a grant towards their installation and subsequent maintenance.

Similar arrangements apply to road improvements on classified roads, one-way and other traffic orders, including speed limits, the installation and maintenance of pedestrian crossings, whilst the size and type of traffic signs are standardized throughout the country. In addition, the Ministry issue recommendations with regard to standards of street lighting and the design and layout of roads and as the majority of important works are carried out with the assistance of a loan from the Government, the Ministry are in a position to insist upon the adoption of their recommendations.

The whole country is divided into areas under the jurisdiction of a Divisional Road Engineer of the Ministry who is in constant consultation with all the Local Authorities in his area upon matters relating to traffic engineering so that the whole process of design and construction is coordinated throughout the country.

It may be that more purely scientific research has been carried out in the U. S. A. but Britain's traffic problems are certainly not dealt with in a haphazard manner, as the engineering staffs of the Roads Division of the Ministry of Transport are specialists in these matters and their advice is backed by the recommendations of specialist committees (on Road Safety and other problems) supported by the full resources of the Director of the Department of Scientific and Industrial Research.

R. A. WRAY
Engrg. Asst. to City Engr.
Kingston-upon-Hull
England

How will they look to YOU a few years from now?

Your wife's eyes: What will you read in hers when she asks whether you can afford that modest cottage that's for sale?

Your boy's eyes: What will you see in his eyes the day he asks whether you can afford to send him to college?

Your own eyes: What will the mirror tell you about them when it's time to retire, and take things easier?

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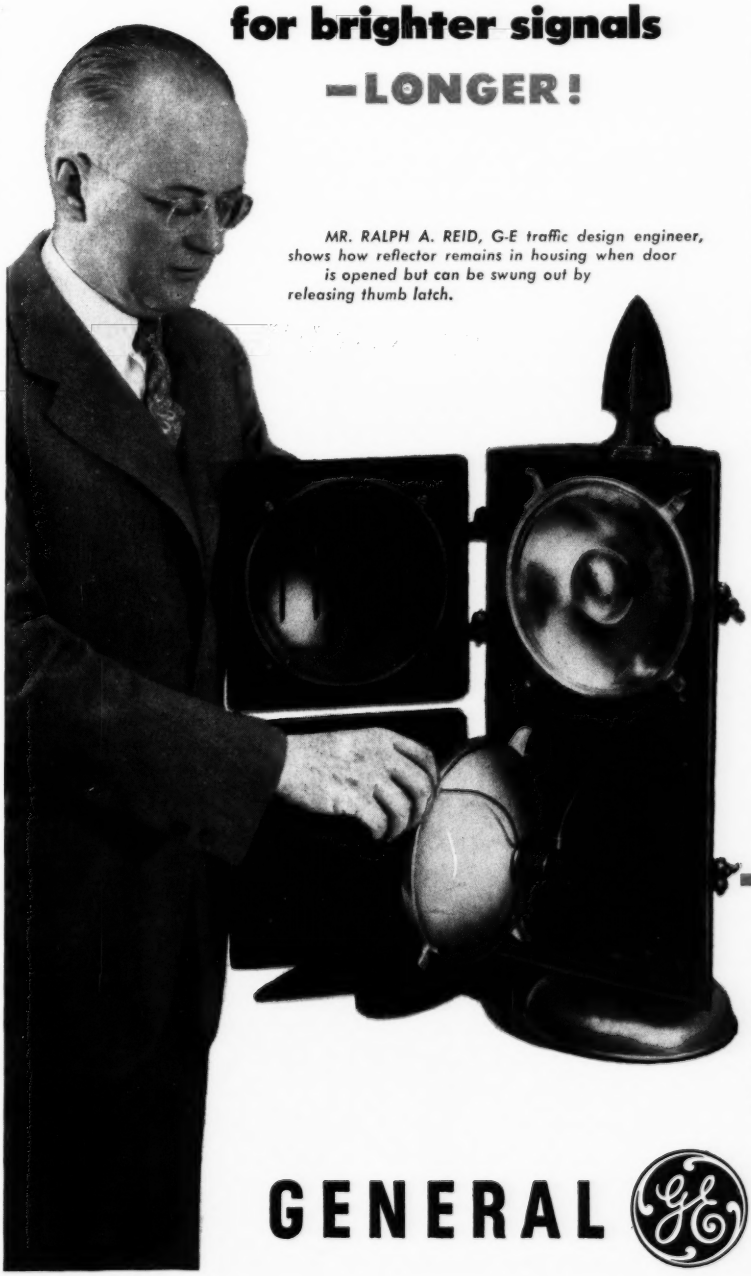

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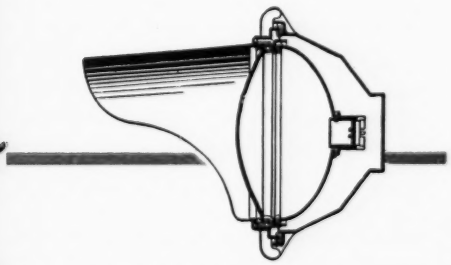

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Frankly Speaking

Traffic research activity, and related committee work, is one of the most important reasons for banding together in a professional organization. Certainly there are many other special benefits but these are secondary to the major objective of culling traffic facts and successful experiences for criteria that may help the traffic engineering profession and aid in the development of a better highway system.

The traffic engineer has and uses many proven techniques today but he must have many more to cope with the ever increasing traffic demands. Intensive and extensive traffic research should produce these.

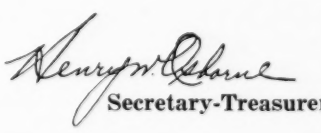
The every-day business pressure for the traffic engineer leaves him little time for extensive study of every type of traffic situation that may arise. There are too many possible channels to investigate; involving the driver, the motor vehicle and the highway. The traffic engineer can, however, justify the time involved in the study of a segment of a particular problem if it fits in with the local task.

In reviewing committees of the *Institute*, one finds they are all of vital interest and extreme need to the traffic engineering profession. Unfortunately, most traffic engineers do not have the proper time to contribute to the committees' objectives.

The *Institute* should have a full-time Research Director on the staff who could, with committee guidance, select the most vital projects for study. An outline of the scope, procedures and assignments to accomplish a thorough investigation of the problems, to provide a concrete answer or findings that will aid the highway profession, should be developed. The research representative could then devote some time in the field to surveying "everyday" traffic engineering and operating techniques. For example, a traffic engineer may have had considerable experience in several new techniques such as truck route designing, special parking privileges for paraplegics, and, transit operation and terminal studies. Generally, time does not permit him to detail these experiences in writing as a committee project. However, the research representative, in a brief visit, could obtain the pertinent facts.

"Through research, and the application of facts, the profession can become a real scientific agency," Wilbur S. Smith, President of the *Institute*, stated in this column of a recent issue. Nathan Cherniack, Vice-President, subsequently stated that every member must participate actively and enthusiastically in research activities of the Technical Committees of the *Institute*.

A well planned research program is needed, with projects well defined so that the traffic engineer can select one or several parts which fit into his daily tasks. Then, when all the results of these individual efforts are combined, the traffic engineer will be making a genuine and worthwhile contribution to the *Institute's* major objective—traffic research.



Secretary-Treasurer

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Truck Loading Facilities as Related to Parking

By CHARLES A. GOODWIN (Jun. Mem., ITE)

Director, Traffic Safety Bureau, Liberty Mutual Insurance Co., Boston, Mass.

WITH the enormous increase in truck transportation since 1940 many unique and seemingly impossible problems have arisen, particularly in urban areas. The saturation point for space usage of city streets is rapidly being reached, and in many cities a super-saturated condition has developed.

The problem is shifting from the *dynamics* of truck traffic to the *static* aspect. While one-way and through streets, progressive signal systems, and urban expressways have greatly expedited the movement of truck traffic in cities, little has been done to alleviate the congestion caused by trucks stopping to load or unload.

It is evident that at least five factors are directly responsible for the serious deficiency of loading space, both off-street and at the curb, as follows:

a. Inadequate curb loading zones for loading demands and vehicle size or, as is often the case, no curb loading provisions whatsoever in areas of high demand.
b. A combination of passenger-car parking violations and lax enforcement resulting in the blocking of commercial alley entrances.
c. Indiscriminate and inconsiderate use of available space by commercial drivers handling large loads.
d. The practice of single establishments receiving or shipping numerous separate loads of the same commodity each day through one or many motor carriers.
e. Inadequate personnel and equipment handling facilities for receiving and shipping freight.

The principal evil arising out of inadequate loading space provision is "forced" parking violations. When the commercial vehicles are forced, by lack of space accommodations off-street and at the curb, to conflict with traffic streams, loading problems become acute and add to general traffic congestions on city streets. (See Fig. 1).

There are definite types of remedial action which may be selected by responsible agencies to correct many of the problems of traffic congestion growing out of parking space competition between passenger and commercial vehicles. These relief measures are applicable to long and short range planning and generally require cooperative action by all parties concerned, being based on factual studies, with consideration given to the achievement of an impartial estimate of needs as well as benefits to be derived.

Fig. 1

CURB LOADING PROVISIONS

A number of factual studies have been conducted to ascertain curb space requirements of commercial vehicles, and some very satisfactory solutions have resulted. Each available relief measure will be discussed in the order of logical application.

Truck Loading Zones

Despite the trend toward comprehensive parking surveys in cities with accompanying provision of off-street parking facilities and increase in curb space turnover, the needs of commercial vehicles at the curb have not, for the most part, been given sufficient or practical consideration. Benefits which may be derived from the installation of meters at curbs are too often offset by evils resulting from a reduction in curb loading space. When parking meters were installed in Wichita in 1946, the number of curb loading zones in the business district was reduced from 168 to 18 and commercial vehicles were forced to double park to make deliveries and pick-ups.[1]

Established methods of measuring demand for loading and unloading facilities at the curb have been based on little more than guesswork or "experience". Factual studies as to the number of trucks servicing establishments, the size of the trucks or the nature of freight handled are uncommon.

[1]Wichita, Kansas, TRUCK LOADING ZONE STUDY OF CENTRAL BUSINESS DISTRICT 1948, Traffic Engineering Division, Department of Service.

It is apparent from the diversified methods of determining the need for curb loading space that zones which may be established offer no guarantee of adequacy or proper location. The Wichita questionnaire revealed that of the 41 cities having loading zones eight cities established zones in relation to a certain number per block, 27 according to requests received, two by need only and two in relation to need established by the Traffic Engineer. In answer to a question as to length of zones, 31 cities replied that no standard length was adopted.

The following standards are submitted by the writer for consideration. Although the standards are not official, they do represent the composite results of a number of studies:

CURB:

Length: 25′ minimum. 30′ or multiples thereof preferred.

Markings: Traffic Yellow curb entire length of zone 6″ wide limit line perpendicular to curb, and special upright signs.

SIGNS: To conform with the Manual on Uniform Traffic Control Devices, Section 47, with the wording "NO PARKING (Time of Day) TRUCK LOADING ZONE."

WARRANTS:

a. No alley or off-street loading space available.
b. Minimum of 12 stops for pick-up or delivery per day, per business establishment, or combination of establishments.
c. Average weight—500 lbs. per stop. Average pieces—10 per stop.
d. Over 50% of commercial vehicles with capacity of 4 tons or over.

RESTRICTIONS:

a. Tractor trailers not permitted in zones except when picking up or delivering a load exceeding 2 tons.
b. Parked commercial vehicles must be engaged in actual loading or unloading in immediate area.
c. Zone not restricted to any particular business establishment or carrier.
d. No private parking permitted in hours specified.
e. Thirty-minute stopping time allowed per vehicle.

DETERMINATION OF NEED:

Study should be based on parking conditions, availability of off-street or alley loading space, frequency of pick-up or delivery size of load, type of vehicle, number of adjacent businesses being serviced, etc.

Parking Prohibitions

Recent parking studies conducted in many cities, and traffic studies and observations by qualified personnel, have indicated that when conditions are such that commercial loading operations cannot be excluded from the streets, careful consideration must be given to establishment of a proper and equitable balance between the truckers' needs and those of other road users.

Parking prohibitions may vary from an extreme of complete prohibitions on city streets to common prohibitions at hydrants, crosswalks, driveways, etc. Parking prohibitions, even in the extreme cases, is beneficial to the transit vehicle, the truck, the passenger car and the pedestrian. However, many of these benefits can be obtained by the application of selective prohibitions that are reasonable and based on need. If the importance of the curb as a parking space is properly related to the importance of the street as a traffic facility and also to the type and demand of curb space user, it is a simple matter to allocate curb space or establish reasonable regulations. For example, an alley or side street in a commercial area may not be adequate as a traffic facility, yet the heavy demand by trucks for alley space should indicate that vehicles not actually engaged in loading or unloading operations must be prohibited, at any time, from parking in alleys or at the curb returns of alley entrances. Nevertheless, the most common obstructions to a truck entering an alley is a parked car, and it is a rarety to find NO PARKING signs at such locations. Nearly all cities covered by the Wichita questionnaire have alleys in the business area and were unanimous in stating that congestion existed in these alleys. (See Fig. 2).

Fig. 2

Narrow streets (30 feet or less), particularly in areas serviced by trucks, should be posted for NO PARKING on at least one side. Without this prohibition, commercial vehicles are restricted in maneuvering, are forced to angle park to the curb or, more serious still, are forced to double park and thus reduce street capacity.

Needless to say, curb parking prohibitions should be enforced if the desired purpose of the prohibition is to be effective. An enforcement officer assigned to a given area should make every effort to keep curb returns, alleys, and curb loading zones clear of parked cars or trucks not actually engaged in loading and unloading operations.

Double parking is a positive detriment to traffic movement and, therefore, a principal cause of truck traffic congestion. As this violation is related to pick-up and delivery operations, it represents an unavoidable practice which exists only because insufficient curb and alley space has been reserved for commercial vehicles on streets where the need for loading space is an established fact.

Loading Time Schedules

The most obvious relief for loading congestion is the handling of shipments in or out during off-peak traffic hours. The principal advantages are the elimination of double parking and the reduction of reserved curb spaces

for loading zones. However, the majority of proposals have resulted in considerable controversy on the part of all concerned. The net result has been the establishment of time limits for pick-up and delivery operations to periods of from 9:00 A.M. to 4:30 P.M., which conform to the opening and closing hours of most establishments and generally parallel the off-peak traffic hours of the week-day.

Time schedules which fall too far outside of the 9:00 A.M. to 4:30 P.M. limits are received with considerable opposition by shippers and consignees, labor unions, and motor carriers because of overtime pay and extra help required for odd hours of operation.

In an attempt to solve the truck loading problem in Wichita, four specific proposals relative to loading time limits were made, and are quoted below:

"1. Restrict deliveries to certain hours of the day with free parking at meters. Most of the business places in the downtown area open their doors at 9:00 A.M. or 9:30 A.M. It might be feasible to allow deliveries in the business area before the opening of the stores to allow the trucks to use the parking spaces without depositing money in the parking meters. This proposal, of course restricts all loading in the downtown business area to a period before 9:00 A.M. or 9:30 A.M.

2. Allow no parking of passenger vehicles in the downtown business area until after 9:00 A.M. or 9:30 A.M. and allow trucks to use the curb space for loading and unloading. Here again loading and unloading in the downtown business area is restricted to the hours before 9:00 A.M. or 9:30 A.M., and it can be said without hesitation that much opposition to this will come from those business people who have to deliver merchandise to the central business area.

3. Restrict all deliveries to the central business district to certain hours of the day, say from 10:00 A.M. to 4:00 P.M., and allow double parking for those deliveries. This proposal is suggested because from 10:00 A.M. to 4:00 P.M. traffic flow is not at a peak. However, such a restriction will not solve the congestion problem during these normal hours of traffic flow.

4. Prohibit all double parking or standing of vehicles in the central business area from 7:00 A.M. to 10:00 A.M. and from 4:00 P.M. to 6:00 P.M. This is more or less of an 'in-between' measure to keep the streets open for moving traffic during the peak hours of the day."

Another example of the current trend toward time adjustments in solving truck loading congestion is found in Providence, Rhode Island, where an agreement was reached between traffic officials and merchants to prohibit deliveries between the hours of 4:30 P.M. and 6:15 P.M. on downtown streets. However, where off-street loading facilities are available, the regulation permitted deliveries during these hours. Another restriction, enacted at the same time, prohibited the use of semi-trailers to make downtown deliveries between the hours of 8:00 A.M. and 6:15 P.M. This has resulted in the breaking down of full loads at terminals to small vehicles for delivery. Hence, if loads were not broken down into small vehicle units and were delivered by semi-trailer before 8:00 A.M. or after 6:15 P.M., shippers and consignees had to keep employees on hand for these odd hours.

OFF-STREET LOADING PROVISIONS

Zoning Ordinance

One of the most effective means of providing off-street loading facilities is through zoning mechanism. In a recent survey, conducted by the Bureau of Public Roads, it was found that, as of December 1, 1947, there were at least 66 local governmental units in the United States that had zoning or other ordinances requiring the provision of off-street truck loading an unloading facilities in connection with various property uses. Only eight of the 66 ordinances designated the size of the off-street loading and unloading berths in precise terms, the average dimensions being 16 feet wide, 25 feet long and 14 feet of overhead clearance. Retroactive ordinances compelling installation of off-street loading facilities in exiting buildings are rather rare; in a number of cases, however, *loading provisions must be complied with if existing buildings are substantially altered or repaired.*

In general, provision of loading space has been based on gross floor area in the establishment being serviced. By a 1940 zoning amendment, for example, New York City required that commercial buildings provide one 250 square foot truck berth for each 25,000 square feet of aggregate gross floor area designed or used for storage, goods display or department store purposes.

The following is a typical zoning ordinance related to off-street loading as proposed for the City of Providence, Rhode Island:

"C. Off-street Loading—On the same premises with every building structure or part thereof, erected hereafter and occupied for manufacturing, storage, warehouse, goods display, department store, wholesale store, market, hotel, mortuary, laundry, dry cleaning or other uses involving the receipt or distribution by vehicles of material or merchandise, there shall be provided and maintained on the lot adequate space for standing, loading and unloading in order to avoid undue interference with public use of the street or alley. Such space, unless otherwise adequately provided for, shall include a 10 foot by 25 foot loading space with 14 foot height clearance for every 20,000 square feet or fraction thereof in excess of 3,000 square feet of floor area used for above-mentioned purposes, or for every 20,000 square feet or fraction thereof in excess of 3,000 square feet of land used for the above-mentioned purposes. These requirements may, upon appeal, be increased, modified or waived by the Board where the conditions or circumstances justify such action provided it has obtained thereon recommendation from the Traffic Engineer."

It would seem that loading area formulae based on floor areas, although quite applicable in the assignment of passenger car parking space, do not provide a real measure of truck loading area requirements. According to Mr. Levin of the Bureau of Public Roads, "the adequacy of a prescribed size of loading berth is a function of a number of variables—(1) the size of the vehicle which will use the space, (2) the nature of the property use to which loading facilities is an accessory, and (3) the design and character of the access."

In this regard, Mr. Hoy Stevens of the American Trucking Association stated that any loading area formulae based on gross floor area, which can produce reasonably consistent results, overlooks one fundamental—namely, that the trucks move goods and not floor area, and that truck loading area requirements should be based on the volume and tonage of freight to be moved into and out of a building.

Although funds for construction of elaborate off-street loading berths may be beyond the means of landlords of multiple story commercial buildings, suitable arrangements may be made to provide a joint loading dock at street level to handle individual freight shipments from a centrally located elevator (See Fig. 3).

Specifications for typical loading berths should conform to the following proposed standards recommended by a Sub Committee on Truck Loading Facilities of the Institute of Traffic Engineers at the recent annual convention.

	Dimensional Ranges
Truck Berths	
Depths behind property line	40′ —50′
Widths	12′ —14′
Overhead clearances	12½′—14′
Freight Platforms	
Depths	12′ —15′
Height	40″ —50″
Maneuvering Areas	
Turning Radii	48′ —60′
Outside edges of truck berths to opposite curbs or outside edges of opposite truck berths	50′ —60′

Interior Block Provisions

The combination in many cities of a gridiron street pattern and emphasis on frontage has divided most central business districts into a series of blocks. The buildings which form the four sides of these blocks average 60 years of age, are pressed closely together and have a first story "face-lifting" which gives a false impression of modern design. However, an inspection of the upper stories and the rear of these buildings would indicate immediately their true age and general deterioration. Except in cases of off-street parking developments, most of the interior of these blocks are in a state of disrepair with rear sections of buildings used for storage and rubbish disposal, or merely vacant.

Fig. 3

There are instances of merchant groups collaborating to procure space for the construction of loading facilities at interior block locations where individual spaces are not available and a single facility could serve a number of business establishments. Such rear-block facilities can be used jointly as customer parking facilities, provided care is taken to keep joint customer parked cars from obstructing access to the interior as well as the manipulation area (See Fig. 4).

Fig. 4

Conclusion

There is no question but that much of the operational delay and truck-in-traffic congestion, common to urban pickup and delivery operations, is directly attributable to the functional inefficiencies of motor carriers, truck drivers, and shippers and assignees. Nevertheless, the responsibility for correcting the physical limitations and space usage of concentrated pickup and delivery areas rests with *all* municipal officials directly concerned with the safe and expedient movement of traffic on their city's streets.

Thirteen States Control Television in Vehicles

Thirteen may be an unlucky number in some circles but right now it represents the total of states which have enacted laws controlling the operation of motor vehicles equipped with television. Word reached us of the passage of television bills in four states since July. These include Illinois, Washington, Wisconsin and Oklahoma.

Television control legislation has been introduced in 30 states; two have killed the proposal, and 6 allowed it to die in committee. The legislature approved a television bill in New Jersey but it was vetoed by the Governor. In the Commonwealth of Massachusetts the proposal was referred to the next session of the legislature.

Measures are still pending in 7 states, or word has not reached us of the final outcome. These states are: Iowa, Missouri, New Hampshire, Ohio, Texas, Tennessee and Alabama. Among these, such states as Missouri are having a recess in the legislative session and the measure will not be considered again until September. The final outcome in Iowa, New Hampshire, Ohio, Texas and Tennessee, should be announced soon. The Alabama legislature is still in session.

A Traffic Safety Coordinated Program

By ARNOLD H. VEY (Mem., ITE)
Traffic Engineer, State of New Jersey, and Secretary,
State Coordinating Committee

THERE is no permanent solution to all our problems—similarly there is no permanent solution to our modern-day traffic problem. One phase or element thereof may be solved only to be replaced by another.

Since highway traffic difficulties are a composite of *man,* of infinite varying character, attitudes, mental and physical abilities; *vehicles* of varying performance ability and mechanical perfection; and *highways* of innumerable design features including topography and alignment more adaptable to "horse and buggy" use and capacities far short of modern needs; we have not been able to reach a common denominator for their solution, at least for some time to come.

We would of course abolish motor vehicle accidents if such action were within reach of civic and governmental leaders. That millenium however lies centuries ahead, if ever. But there is no reason for complete despair. There is, conversely, a possibility beyond presumptive evidence that progress toward a somewhat lesser goal is attainable in the not too distant future. Such accomplishment, however, will require a new approach to the problem and a concept of concerted action by all responsible authorities not heretofore experienced.

This new approach was initiated in New Jersey more than a year ago but, unfortunately, because of its newness, organization difficulties, the size of the effort and insufficient willing sacrifices of time on the part of all officials involved, the desired progress has not yet been made.

Briefly, the "approach" is a statewide program of coordinated action, through collective state, county and municipal effort, directed toward a common goal.

Development of the Organization

The impetus for a coordinated program was initiated at the Governor's Highway Safety Conference held in 1947 following the creation of a State Coordinating Committee. This committee, composed of the Commissioner of Motor Vehicles, the Superintendent of State Police, the Commissioner of Highways, the President of the Board of Public Utility Commissioners and the Commissioner of Education was assigned the following responsibilities:

1. Appraisal of existing traffic conditions based upon factual data, determining what is needed to develop an official state program.
2. Coordinate the highway safety activities of the various State Departments.
3. Cooperate with local and county officials for essential coordination of local official programs with those of the State.
4. Advise the public of the elements of the State Program and the necessity for public support and cooperation.
5. Periodically advise the Governor of the status of the Program, including recommendations for future action.

Through cooperative action with the State Safety Council there was also established a public support organization comprised of representatives of statewide civic, professional, business and industrial groups able and willing to contribute to the solution of the motor vehicle accident problem. The mission and responsibilities of this public support group are: (1) to represent the public at large in statewide safety activities; (2) to cooperate with the official State Coordinating Committee; (3) to assist in the conduct of a continuous statewide public information program in cooperation with and support of the official program; (4) to participate in statewide, as well as community safety efforts; and (5) to encourage the formation of local and county official coordinating committees, as well as a public support organization patterned after the State organization.

Several resolutions were adopted at the 1947 Governor's Highway Safety Conference, one of which urged the immediate establishment of Municipal and County Coordinating Committees and public support organizations as counterparts of the State Committees.

A Coordinated Program

The major accomplishments of the State Coordinating Committee up to the present time include the endorsement of and participation in statewide newspaper campaigns, a section by section comparison of the State Traffic Laws with the various acts of the Uniform Vehicle Code, and more recently the preparation and distribution to local Coordinating Committees of a by-monthly program based upon major violations causing accidents, including suggested engineering, enforcement and education activities to combat their occurrence.

The engineering efforts suggested in these by-monthly programs emphasize particularly the application of traffic engineering techniques essential for the improvement and efficiency of existing streets and highways. In other words, making better use of the present street system.

Each of these by-monthly programs emphasize the importance of coordination and stress factually the possible accomplishments of joint efforts and concerted action, not alone from the standpoint of uniformity in methods of control and regulation of traffic, but also uniformity in enforcement of the rules of the road.

A coordinated program intelligently applied will partially offset the shortages of manpower, especially in the field of enforcement and education. In many of the smaller

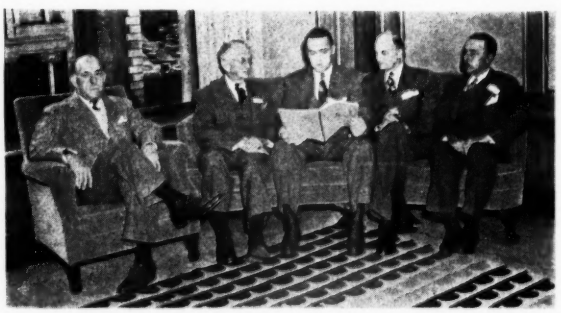
communities of New Jersey a large percentage of vehicles traveling daily within and through such communities comprise out-of-town motorists who may or may not be indoctrinated with the traffic control procedures and enforcement policies of that community. It is most difficult, therefore, to obtain a large percentage of voluntary observance of the rules of the road unless motorists in their home communities practice like procedures. A coordinated program, on a large area-wide basis, will result in general voluntary observance of the traffic regulations and rules of the road, leaving the available manpower to bring under control the smaller percentage of "die-hards" who must have the threat of the "big stick" to obtain their cooperation.

The program was given increased impetus at the recent meeting of the New Jersey State League of Municipalities. In a well-attended panel at the Conference the leading problem of municipal officials—traffic—came in for a full round of discussion. Considerable attention was given to the best means of furthering the statewide program through the coordinated effort of municipalities.

It is too early to accurately measure the effectiveness of this effort in New Jersey. Some communities and some areas of the State are making more progress than others. However in all sections of the State the necessary organizations have now been established.

Local governments in New Jersey are the front lines in any highway safety program, backed by state and municipal governments as policy making and coordinating agencies. Higher levels of government also have the responsibility of aiding smaller communities, technically and otherwise, in those matters where it is not economically proper or possible to maintain needed local action. It remains, however, for each community to individually participate in a coordinated effort commensurate with its abilities and needs.

A coordinated program based upon factual determinations, intelligently and continuously applied and backed by a well informed public is the necessary combination to reach the desired goal.



Shown in an informal pose are the principal speakers on the "traffic" panel at the meeting of the New Jersey League of Municipalities: left to right, Monroe Taylor, City Engineer and Traffic Engineer, New Brunswick, N. J.; Milo S. Bordon, Mayor, Maplewood, N. J.; Chester W. Paulus, Mayor, New Brunswick, N. J.; Arnold H. Vey, State Traffic Engineer, N. J. Division of Motor Vehicles, and Secretary, N. J. Highway Safety Coordinating Committee; and Leo R. Welch, Supervisor of Safety Education, N. J. Division of Motor Vehicles, and Sub-Committee Chairman of the N. J. Highway Safety Coordinating Committee.

Maximum Safe Stopping Distance For Trucks and Buses In Accordance With ICC Regulations

Speed Miles Per Hour	Feet Per Second	Vehicle Travels (One Second) Reaction Time	Braking Distance	Total Stopping Distance
20	29	29	30	59
30	44	44	67	111
40	59	59	120	179
50	73	73	188	261
60	88	88	270	358
Speed of vehicle	Speed of vehicle	Distance traveled in one second before brake can be applied after seeing danger.	Distance required to stop after brake is applied with good pavement and fair brakes (in feet)	Total feet covered after seeing danger (in feet). Reaction time plus stopping distance.

Southern Motor Cargo, September 1949

Highway Research Abstracts, October 1949

Ground Transportation Terminal Facilities at Airline Airports

By WILLIAM R. B. FROEHLICH

Chief Planning Engineer,
Pittsburgh Regional Planning Association

In addition to the usual surveys of airport use that are conducted to guide the planning of a new airport or the improvement of one that is existing, a survey that would indicate the ground traffic likely to use the new or expanded facility should also be included. Such information would allow more accurate planning of the means of access to the airport and the ground transportation terminal facilities at the airport.

Flexibility and expandability of ground transportation terminal facilities must be a constant consideration in planning and design because of the uncertain rate of growth of aviation as a means of transportation. The design criteria listed herein should be considered only as a guide to the solution of special situations that may occur at various airports.

At many existing airports that were poorly laid out initially, from the ground transportation viewpoint, much could be done through the application of sound traffic engineering principles. Outstanding examples of how applied traffic engineering has improved conditions may be found at LaGuardia Field, now operated by the Port of New York Authority.

As airplanes become safer and cheaper carriers, increasing numbers of lower income groups will turn to air travel. Mass, common carrier types of transportation will then be used by air passengers to a greater extent. Therefore, service must be inexpensive, convenient and rapid in order to maintain the city-to-city air link.

The provision of ground transportation transfer facilities will be greatly affected by the fact that municipalities operating airports, and airport managers are beginning to realize that airports may be made self-sustaining. This can be accomplished by attracting the public to the airport through the exploitation of the natural sightseeing value of the air terminal with its constant, spectacular air show. This policy of maintaining the airport's operations with non-flying revenue will require additional area for automobile parking, will affect the design of access roads to the airport, and will increase common carrier loads particularly on week-ends and holidays. All this must be accomplished without reducing the effectiveness of the airport in its primary function of acting as a quick, convenient, transfer facility between the airplane and the city.

THE PROBLEM OF CONNECTING THE AIRPORT WITH ITS CITY

SINCE its inauspicious beginning less than half a century ago, aviation has taken on increasing stature until, now, it has become a major means of transportation. Its advance has been, and will continue to be, marked by dynamic changes and developments. In much the same manner as improved automobile design made existing roads and highways obsolete, technological improvements in aircraft and rapidly increasing air passenger, freight, and cargo traffic have made aviation's ground facility, the airport, woefully inadequate.

Prior to 1940, the concern of almost all airport planners was entirely in getting the planes on and off the ground. As a result, runways and taxiways received all the priority while the administrative and service areas were fitted into whatever space was left. Consequently, the plane to city connection—airplane to terminal building, to ground transportation facility, to city—was very often the bottleneck of the entire trip. Because these airports were inflexible in design, these same faults have been carried over and still exist in the expanded airport of today.

This airplane-to-city connection is a vital link in the air transportation chain. The great advantage air travel enjoys over other means of ground travel is its speed; the development of the Lockhead Constellation and other fast planes promise even greater air speeds. But too often the time advantage gained in the air is mitigated by the relatively great length of time required to travel from the city to the airplane and, at the destination, from the airplane to the city. Table I shows typical city-to-city travel times. It is particularly significant that the total ground time for trips of about 200 miles (New York City to Boston or New York City to Washington, D. C.) is greater than the total flying time. Even more striking is the fact that from New York City to Chicago, an airline distance of 713 miles, the ground time is 62 per cent of the flying time.

The airport-to-city connection may be further broken down into two parts: transfer within the air terminal to the ground transportation facility, and the actual trip from the airport to the city. The circulation of passengers and goods within the airport and the ground transportation transfer arrangements determine the facility and speed with which air passengers and goods move through the air ter-

TABLE I

TOTAL AIR TRAVEL TIME BETWEEN SEVERAL CITIES

(City to Airport to Airplane to Airport to City)

	City to Airport	Airport to Airport	Airport to City	Total Flying Time	Total Ground Time	Ground Time as Percent of Flying Time	Total Time
New York City to Boston	40 min.	55 min.	25 min.	55 min.	1 hr. 25 min.	155	2 hr. 20 min.
New York City to Washington	40 min.	1 hr. 15 min.	30 min.	1 hr. 15 min.	1 hr. 30 min.	120	2 hr. 45 min.
New York City to Indianapolis	40 min.	4 hr. 10 min.	35 min.	4 hr. 10 min.	1 hr. 35 min.	38	5 hr. 45 min.
New York City to Wichita	40 min.	7 hr. 50 min.	30 min.	7 hr. 50 min.	1 hr. 30 min.	19	9 hr. 20 min.
New York City to Chicago	40 min.	3 hr. 15 min.	60 min.	3 hr. 15 min.	2 hr. 00 min.	62	5 hr. 15 min.

Note: Total ground time includes 10 minutes at each airport for airplane-to-ground transportation facility transfer.

Source of Data: American Airlines

minal. From the airport to the city, ground transportation carries the entire load, with a few minor exceptions where water taxi and helicopter provide a token service. For the future, helicopters show promise of providing a quick connection between the airport and the city. But they will not be such volume carriers that they will take an appreciable percentage of business from surface carriers. Therefore, ground transportation facilities must bear the major burden of travel between the city and the airport.

Although airports and aviation in general have been considered, five airports were selected for detailed study. Data obtained through case studies are listed throughout the remainder of this article.

ANALYSIS OF TRAFFIC GENERATORS AT AIRPORTS

To determine the ground transportation transfer facilities required at airports, one must examine the basic users and uses of the airport—the people and goods flowing through it. Space limitations will limit this discussion to a consideration of the human element—the people who move to and through an airport.

The people who use airports may be grouped into five classifications: (1) passengers, (2) subsidiary passenger traffic, (3) employees, (4) sightseers, and (5) incidental users. Each category will be treated separately, but it should be remembered that the categories are not always distinct. For example, people who come to an airport to pick up an air passenger (classified as "subsidiary passenger traffic") may also come because of the sights they may see.

The number of daily scheduled flights and the available seats for flights in and out of Logan International Airport and LaGuardia Field are listed in Table II. The percentage of use of the total number of available airplane seats by revenue passengers is the load factor; this load factor averages under 60% in winter and fluctuates between 75 and 90% in spring, summer and fall. The average load factor for all domestic trunk airlines for 1947 was 66%. Therefore, the total number of passengers using each airport daily would be somewhat less than the available seats, due to the incomplete occupancy of all the seats and a certain number of passengers who are not terminating at the airport but are continuing through to other destinations; the total number of through passengers at a terminal airport such as LaGuardia only average two per cent.

Other terminal airports such as Boston and Washington have a slightly larger percentage of through passengers, and, at intermediate airports, the through passenger usually out-numbers the terminating passenger.

An air passenger survey conducted jointly by the airlines serving New York and the Port of New York Authority from November 8th through 15th, 1947, showed that 71.8% of the passengers were male and 28.2% were female; the survey also revealed that 16.4% of the passengers were under 26 years old, 57.0% were from 26 to 45, and 26.8% were over 45.

The incomes of the present-day air passengers are still well above the national average. According to the survey cited above, 39.3% of the passengers earned under $6,000 per year, 38.7% earned from $6,000 to $15,000, and 22.0% earned over $15,000. Herein lies one of the reasons why air passengers still demand and will pay for luxury type ground transportation accommodations.

The reasons air passengers give for traveling differ widely from passengers in general. The results of a survey of all forms of domestic "out-of-town" travel in 1941 prepared for Greyhound Corporation indicated that 69% of the travelers made trips only for personal reasons, 20% traveled only on business, and 11% made both personal and business trips. On the other hand, of those persons traveling by air, the New York survey showed that 33.9% traveled for personal reasons (either for pleasure or because of a personal emergency), 52.3% traveled on business, and 13.8% made combination business and pleasure trips. The fact that the majority of air passengers travel for business reasons explains why many airplane flights are scheduled only on week-days and partially explains why the peak periods of scheduled flights are between 8:30 and 9:00 A.M. and 4:30 and 5:00 P.M.

The number and type of future air passengers are largely a matter of speculation. Several factors will de-

TABLE II

DAILY SCHEDULED FLIGHTS (IN AND OUT)
LAGUARDIA AND LOGAN INTERNATIONAL*

	LAGUARDIA — DOMESTIC				LOGAN	
	WEEKDAY		SUNDAY		WEEKDAY	
	Flights	Seats	Flights	Seats	Flights	Seats
DC-3	214	4500	202	4240	89	1870
DC-4	127	6620	102	5310	47	2440
DC-6	27	1403	26	1352	—	—
L-49	16	1024	16	1024	—	—
CESSNA	—	—	—	—	10	20
TOTAL		13,547		11,926		4330

* As of Sept. 2, 1947

Source: Port of New York Authority and Airplane Manager, Logan International Airport.

termine the rate of increase in air passengers: (1) airline fares compared with fares of other carriers, (2) the relative safety of travel by air, (3) the convenience of the trip, both from the standpoint of overall time of trip and frequency of schedules, and (4) the dependability of scheduled service. An economist closely concerned with aviation recently estimated that, in five years, domestic passenger fares would range from 3.0 to 3.5 cents per mile (present rate is 5.0 cents per mile) and that airlines would divert from surface carriers: 75% of the Pullman traffic for distances greater than 500 miles, 30% of railroad coach traffic for distances greater than 500 miles, and smaller percentages of Pullman and coach traffic for distances from 100 to 500 miles. Although this estimate seems rather optimistic, it is nevertheless quite certain that air travel will drain larger proportions of travelers from the railroads as the airlines become more inexpensive and more responsible carriers.

The air passenger himself attracts a certain number of people to the airport. Friends or relatives may deliver him to an outgoing flight or call for him as he lands from an incoming flight; also, a business man may meet or deliver or send some kind of conveyance to transport an associate traveling by air.

A third category of airport user is the employee. Table III shows the number of employees per case study airport compared with the 1947 plane movements. The employees at an airport are basically of two types: airport employees and airline employees.

The airport employee may, in turn, be of two types. He may be employed by the airport manager and will be engaged in some phase of operating or maintaining the airport, or he may be employed by one of the concessionnaires and will be serving other airport users. The number of concession employees varies widely at airports, depending upon the management policy of developing revenue producing facilities for the airport.

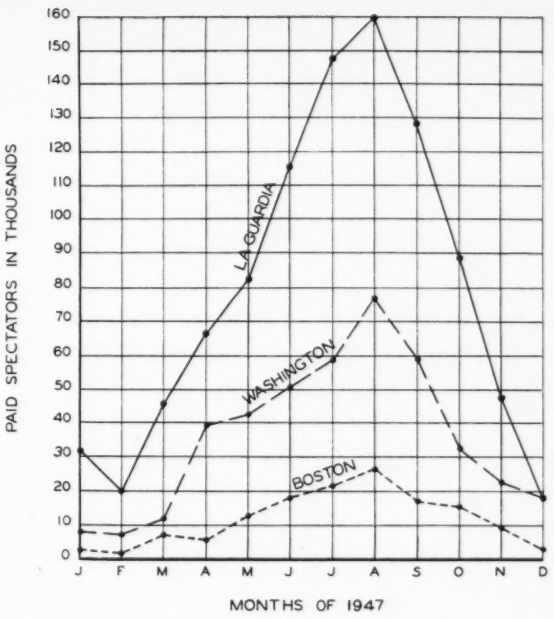
Airline employees normally constitute the majority of the total number of employees at the airport, and service personnel constitute the majority of these.

TABLE III
EMPLOYEES AND PLANE MOVEMENTS—
CASE STUDY AIRPORTS

AIRPORT	EMPLOYEES	PLANE MOVEMENTS — 1947 SCHEDULED	UNSCHEDULED
LAGUARDIA	9360	140,291	29,382
BOSTON	2100	53,500	—
WASHINGTON	7000	105,224	54,446
INDIANAPOLIS	500	54,200	265,000
WICHITA	400	26,519	156,500

Source: Managers of airports listed.

Sightseers are, and undoubtedly will continue to be, of major significance in airline airport use. The number of sightseers drawn to an airport is dependent upon the airport size, the population of the metropolitan area it serves, the airport location related to its regional urban clusters, and the airport management policy. The number of sightseers is not completely dependent upon the population of the urban area the airport serves; Logan Airport at Boston, with a surrounding metropolitan population of 2,000,000, had only one-third the spectator patronage of Washington National Airport with a metropolitan population of 1,500,000. The accompanying graph shows that the number of spectators at airports in the temperate zone varies markedly with weather conditions; peak conditions in July, August, and September and low volumes during December, January, and February accurately reflect the temperature level and general weather conditions during those months. Similarly, the number of sightseers varies widely during the week, with the greatest number visiting the airport over the week-end. For example, at LaGuardia Field the average number of paid sightseers daily, during the month of August 1947 was 5160. However, the average summer week-end day brought approximately 12,000 paid spectators, with as many as 13,000 going through the turnstiles in one afternoon. Of course, the total number of sightseers would be greater than the number of *paid* sightseers, since many people do not pay the ten cents to view the plane movements from the observation deck. But this total number of sightseers has not been measured. The manager of Washington National Airport estimates that the number of paid spectators amounts to approximately 50 per cent of the total visitors at the airport.



SOURCE OF DATA — AIRPORT MANAGERS

PAID SPECTATORS IN 1947
AT THREE AIRPORTS

The trend in airline airport management is to exploit to the fullest all means of producing revenue so that the airports may be lifted out of their present unprofitable state. Airport managers recognize that sightseers are willing to spend money at airports. Therefore, all ways of attracting sightseers to airports are being investigated and instituted where feasible. A good example of this approach is reflected in the plans of the Port of New York

Authority for New York International Airport, where it is expected that such a show-place will be created that approximately 75 per cent of all the airport's revenue will be obtained from non-flying airport users.

The final classification of airport user embraces a relatively small number of people who come to the airport for incidental reasons. This includes visits of salesmen and suppliers to concessions, business men to airline and airport offices, and users of such specific airport facilities as the restaurant or branch bank. The number of this last category may be substantial if, for example, the restaurant is attractive enough due to its setting, cuisine, and service to draw patrons to it alone, or if the branch bank would offer more convenient and better parking facilities than similar banks nearby.

TYPES OF GROUND TRANSPORTATION REQUIRING TERMINAL FACILITIES

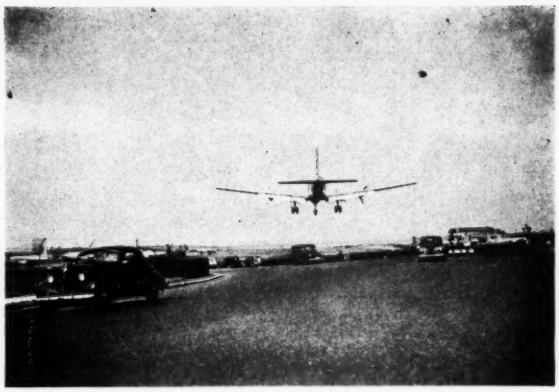
In many cases ground transportation terminal facilities at airports are inadequate and poorly located, and although the condition may be relieved to some extent through judicious application of traffic engineering principles, the would-be menders are bound by unchangeable restrictions imposed by the original airport planner who regarded the airport only as a place to land and take off airplanes, rather than a major transfer point for the efficient movement of people and goods.

All airline airports of appreciable size provide terminal facilities for four general types of ground transportation: automobiles, common carriers of several varieties, contract carriers, and trucks. The percentages of passengers and employees traveling to and from the airport in all types of conveyances for various airports is shown in Table IV. Such a few number of samples can give no conclusive results; however, they do indicate the general magnitude of the types of transportation used.

Automobile

It can be seen from Table IV that the percentage of employees traveling to work by automobile varies from 29% to 75%. Even the lowest percentage shows that the number of employees' automobiles is large enough to merit special parking facilities. The service area and administrative area of an airport are usually so separated that separate parking areas are necessary for service and administrative employees.

The public traveling to and from the airport consists of passengers, their friends and relations, sightseers, and incidental users. Studies of transportation use have been made regarding the method of travel of passengers, only, to and from the airport; Table IV shows that 28.8% of LaGuardia passengers travel by private automobile while 34% of Indianapolis passengers travel by automobile. The great majority of persons who come to the airport only as sightseers travel by automobile. However, no accurate information is available as to how high the percentage is.



Airplane landing near road at southwest end of Northeast-Southwest Runway at La Guardia Airport. Planes have little vertical clearance over the road while landing or taking off. This condition is being corrected by construction of an alternate road.

Photograph by The Port of New York Authority

Contract Carrier

At present, the largest percentage carrier of passengers is the limousine or luxury bus service which transports air passengers between the airport and airline offices or hotels in the central city. Rates are about equal to taxi fares, and naturally are much higher than common carrier buses. The chief attractions of this operation to the air passenger are: (1) a guarantee that the limousine will meet the scheduled air flight, and (2) the fact that the service is an exclusive, deluxe operation in which baggage is cared for by the carrier and wherein passengers are supplied with individual, comfortable seats.

The service consists of 8 or 11-passenger limousines and 23-passenger luxury type buses. At the larger terminal

TABLE IV

TRAVEL TO AND FROM CASE STUDY AIRPORTS

AIRPORT	TYPE OF USER	PERCENTAGE TRAVELING BY					
		AUTO.	BUS	LIMOUSINE	TAXI	TROLLEY	OTHER
LAGUARDIA	PASSENGERS*	28.8	4.0	44.3	21.0	0.2	1.7
	EMPLOYEES	31.	55.	—	—	4.	—
WASHINGTON	PASSENGERS	—	—	37.8	—	—	—
WICHITA	EMPLOYEES	75.	20.	—	—	—	5.
INDIANAPOLIS	EMPLOYEES	62.	37.	—	—	—	1.
	PASSENGERS	34.	4.	60.	2.	—	—

*Also includes Newark Airport

Source: Airport managers of airports concerned and Air Transport Assn. of America.

airports, the smaller limousines will soon be almost completely replaced by the larger luxury buses because the increased capacity of airplanes require the contract carriers to carry more passengers per flight.

As mentioned before, the contract carriers' popularity is based on the fact that they guarantee to meet airplane flights for which their customers have reservations, and that the air passenger is in such an income level that he demands and will pay for superior service. However, when the number of airplane flights are increased to such an extent that reservations are no longer necessary, and when the airline fares are reduced to such a point that lower income groups will be drawn to air travel, the advantages the contract carrier now enjoys will disappear; then, such operators' activities will become relatively less important, and may even be discontinued.

Common Carrier

The use of common carriers varies greatly depending upon the type of carrier. Buses are a major transporter of employees but carry only a small number of passengers. On the other hand, taxis, though ignored by employees, are a significant carrier of passengers.

The future of mass carrier transport to and from the airport is a matter of conjecture. At present, the most consistent source of mass transit patronage is the emp'oyees; however, this load is heavily concentrated during the normal work-day peak travel hours and at the time of change in airport shifts. In 1946, the American Transit Association polled more than one hundred transit companies regarding mass transportation to airports; the majority opinion was that a mass transit facility serving only an airport was not economically feasible. In most cases of successful rail or bus service, the airport is not an isolated terminus of the line, but rather one of several stops on a regular transit route. More recently, in the spring of 1948, the Metropolitan Transit Authority in Boston, Massachusetts, inaugurated two express bus lines operating from Logan Airport on a fifteen minute headway, one terminating at North Station and the other at Copley Square via South Station. Fare for the 15 to 18 minute trip was ten cents. In March 1948 these lines were handling approximately 9,000 passengers per week; this averaged 5.5 passengers per trip for a gross trip revenue of 55 cents—hardly an economical venture. Through 1948 the express bus service was largely ignored by airport users, until finally, in February of 1949, the lines were discontinued due to lack of use.

Taxicabs often do a substantial business at airports. This is particularly true for those cities where the airport is close to the central city. Taxi operation is benefited because of the large number of high income people who travel by air and desire individual service.

DESIGN CRITERIA FOR GROUND TRANSPORTATION TERMINAL FACILITIES

Automobile Parking

The number of total parking spaces necessary should be determined through an estimate of the number of spaces required for each type. The spaces needed for employees and for official parkers can be predicted with a good degree of certainty. But the parking spaces required for the public (passengers, subsidiary passengers, and sightseers) cannot be accurately determined. Initially, the size of the public parking areas should be based on an estimate of the number of spaces required, but the lots should be readily expandable if the demand requires it. The C. A. A. has said that, "no large airport yet constructed has allowed sufficient space for this purpose in the administrative area."

All parking areas should be laid out for customer parking since the additional space required over that needed for attendant parking is usually available. Adequate lane marking, night lighting, and pedestrian access walks to these areas are important.

Five types of parking areas should be provided. Each will be discussed in detail below.

Lots for Public—The area in front of the terminal building entrance is the most accessible and should be set aside as a public parking area; this area will accommodate only part of the public automobile load. Since the peak public use of an airport occurs during week-ends and holidays when many of the airport employees are not working, the public lots and employee lot should be adjacent or inter-connected in some way so that the employee lot may be used by the public during slack periods, allowing one attendant to collect fees from both. The Port of New York Authority has successfully tried this scheme at La Guardia and is receiving substantial revenue from the extra employee parking space. During week-ends and holidays in the Spring, Summer and Fall when the weather is good, even the public lots and employee lots, combined, cannot accommodate sightseers' cars. Therefore, additional parking lots should be provided in less-favorable locations to take care of this overflow.

A well laid out parking lot adjacent to terminal building at La Guadia Field.

Photograph by The Port of New York Authority

Airport managers have found that charging a nominal fee for parking in the public lots is a good source of revenue to help put the airport on a sound financial basis. Washington National Airport is successfully operating a ticket validating system in which the parking fee is refunded when the visitor's check is stamped indicating a purchase.

Employee Lots—Several parking lots are usually necessary for employees. One lot should be provided for the

airport and airline employees in the terminal building area; the lot should be located near the terminal building, and should be so related to the public parking lots so that it may be turned into a revenue parking lot, on occasion, as explained above. Other lots should be provided for airport service and maintenance employees in the service and maintenance area.

Official Parking—A small official parking area should be provided adjacent to the terminal building. This space should be reserved for important city and state officials using the airport and for diplomatic arrivals and departures.

Baggage Pick-up and Unloading Area—For passengers who have heavy baggage, a small parking area may be set aside near the concourse where passengers may park their cars for a short time so that they may load or unload baggage. The Port of New York Authority has provided at La Guardia fifteen spaces in this area and allows free parking for twenty minutes; people parking over twenty minutes are charged fifty cents.

Parking Garage—At larger airports serving a high volume of long-distance travelers, a parking garage may prove profitable. The parking garage largely would serve those people who would be gone for several days or those who desire greater protection for their cars. During ten days in November of 1947, 23.6%, of 19,900 passengers passing through New York City's airports indicate they would use a parking garage. Although this kind of a "desire survey" may not be statistically reliable, there is, nevertheless, a strong indication that a parking garage would be well-patronized at a large airport. Such a parking garage would be doubly attractive to the public and an important revenue producer for the airport if it had automobile servicing facilities.

Contract Carrier Loading Area

Terminal facilities at an airport for contract carriers should be no problem. The luxury bus or limousine may load or unload on the concourse opposite the plane gate at which the flight is scheduled. A small standing area may be provided near the concourse for vehicles waiting to be called for loading.

Bus Loading Area (Common Carrier)

Common carrier buses may have several scheduled stops in the airport area. One stop should be in front of the terminal building to serve employees, passengers, and sightseers; this stop should be so located that it will not conflict with automobile and taxi traffic. Depending upon the size of the airport, other stops may be scheduled at the maintenance area during shift changes to serve employees.

At present, of the mass carriers, only the limousines and luxury buses of the contract carriers are permitted to deliver and pick up passengers from the concourse. However, when airline fares are lowered and the volume of passengers using common carrier facilities is greater, there is no reason why common carrier buses should not be allowed access to the concourse. The extensive length of the concourse will allow scheduled bus stops at several points without interfering with the truck and limousine operations.

Rail Transit Stops

It is unlikely that rail transit stops would be warranted at any but the nation's largest terminal airports in the near future. The new Orchid Airport in Chicago is planned to be the terminus of a rail rapid-transit line. On the other hand, the New York International Air Terminal will have no rail facilities going directly to the terminal building; however, it is planned to run a shuttle bus between the airport and the Long Island Railroad which skirts it. Similarly, an extension of a Boston Metropolitan Transit Authority rapid transit line will include a stop opposite the airport, with shuttle bus service being provided to the airport proper.

Concourse at La Guadia Field showing luxury buses opposite plane gate positions at concourse. Note spectators on observation deck above concourse.

Photograph by The Port of New York Authority

Taxi Loading and Unloading Area

Taxi loading zones should be located at the terminal building, but sufficiently separated from the bus and private automobile loading areas so as not to cause conflict and congestion.

Taxi lines should not be allowed to build up opposite the terminal building. Rather, curb space should be provided for a few vehicles opposite the terminal building, with a pool area located out of the way of traffic lanes or parking areas, but within calling distance, where extra taxis may wait until they are called.

CONCLUSION

From the traffic engineer's and traffic planner's point of view, each airline airport is an individual problem. The air traffic flowing in and out of it will be dependent upon its location with respect to the airways and other airports and the many physical and economic considerations regarding the metropolitan area it serves. The amount and type of ground traffic using the airport will depend upon the air traffic and the number of additional people attracted to the air terminal. Therefore, no set pattern can be proposed as a solution to the ground transportation problem. The solution will vary with the airport.

A condensation of a thesis presented at the Yale Bureau of Highway Traffic in May of 1948.

Off-Street Parking News Round-up

By LeVERNE JOHNSON (Assoc. Mem., ITE)

Traffic Engineer, American Automobile Association
Washington, D. C.

(Continued from January 1950 issue, page 165)

ROYAL OAK, MICHIGAN (Pop. 25,000)

On December 20, 1948, the City Commission adopted an ordinance to provide for acquiring and operating automobile parking facilities and to establish an automobile parking system for controlling and operating present and future parking facilities. The ordinance further provides for a Parking System Advisory Committee, which is now engaged in making studies and surveys for the development of off-street parking facilities.

The Committee has unanimously recommended the acquisition of a surface parking lot in the north central business section of the City. Option agreements for the purchase of the selected properties are now being secured.

It is anticipated that most of the cost will be financed by the issuance of revenue bonds and part of the cost may be financed by the issuance of special assessment bonds. A referendum for the issuance of such bonds is not required. It is intended to use the net revenues from on-street parking meters and revenues derived from the operation of the parking lot, to liquidate the bond issues. (Reported by E. M. Shafter, City Manager).

MINNEAPOLIS, MINNESOTA (Pop. 492,000)

The city does not have a parking authority and none is contemplated. A study of off-street parking is under way.

Public garaging facilities can be built under the Elwell Law, which was passed several years ago, wherein the city must assess at least half of the cost against the benefited property. The recently passed state law, which amended the Elwell Act enables the city to assess up to 80 per cent of the cost against the benefited property, with the balance of the funds being collected out of operating fees. The city is handicapped by not being able to rent any of this space in the proposed garage facilities, thus losing a valuable source of income which could be applied against the cost of the structure. (Reported by R. H. Sprungman, Traffic Engineer)

SAINT PAUL, MINNESOTA (Pop. 287,000)

During 1949, the city opened two free municipal parking lots which provide 350 parking spaces. These lots are in a location about four blocks from the City Hall and other office buildings, but are about seventy-five feet below the general street levels so that a steep hill or stairways must be climbed by users of the lots. About 70 to 80 per cent of the spaces are occupied each day.

Another larger lot is planned for development in 1950. (Reported by M. W. Hewett, Traffic Engineer)

JACKSON, MISSISSIPPI (Pop. 62,000)

The city has on hand approximately $400,000 of bond issue money which was voted in 1947 for the acquisition of off-street parking lots. There was an attempt made to acquire a downtown lot through condemnation proceedings. After a year in court, this case was lost by the city. There is now being made a study of other sites, but at this time nothing definite has been decided.

Facilities would be financed by bond issues; a referendum is not necessary for such bond issues; there is no parking authority, this power being vested in the City Council; facilities may be operated by the city or may be leased to private operators. (Reported by J. J. Halbert, Director of Public Works)

JERSEY CITY, NEW JERSEY (Pop. 301,000)

A parking authority was created by City Ordinance about September 1, 1949, as authorized by a 1948 State Enabling Act. Members have been appointed, tentative plans are being formulated for clearing up curb parking misuses and for the provision of facilities off the street by the authority. No financing plans have been announced. (Reported by Samuel R. Fletcher, President, Automobile Club of Hudson County)

NEW YORK, NEW YORK (Pop. 7,454,000)

Legislation is pending in the City Council to install parking meters and use net revenues for capital expenditures to ameliorate traffic conditions.

New York City now has power to acquire property for the purpose of construction and operation of garages and parking spaces either by the municipal government itself or to lease or sell property to private enterprise.

Legislation recommended by the Traffic Commission will be introduced in the 1950 session of the State Legislature to authorize creation of a New York City Parking Authority in order to issue bonds outside of the debt limit to obtain necessary funds to finance its operation.

New off-street facilities now under construction include: (1) the Union Bus Terminal, which will accom-

modate 450 cars on the roof; (2) the Battery Garage, accommodating 1050 cars and expected to open in April; (3) the St. George Ferry Terminal, which will accommodate 250 cars and is expected to open in June; (4) the Union Truck Terminal, designed to accommodate 144 trucks and to handle 2000 tons of merchandise daily, being constructed by the Port of New York Authority, and expected to open in November; (5) the United Nations Garage, which will accommodate 1500 cars of United Nations employees and official visitors, and expected to open in March of 1951.

The Traffic Commission has recommended the use of parking meters and legislation is before the City Council for such authorization. (Reported by T. T. Wiley, Director, Department of Traffic Engineering, and Martin Klein, Automobile Club of New York)

CHARLOTTE, NORTH CAROLINA (Pop. 101,000)

Charlotte has established a Parking Commission of five members with the City Traffic Engineer as Technical Advisor. A Federal, State and City-sponsored parking survey has been completed and the Commission has set up a four-point program which has been approved by the City Council. The program involves:

(1) A plan for time limit parking.
(2) A master off-street parking plan.
(3) Permission to use parking meter revenues for off-street parking purposes.
(4) The establishment of a permanent parking commission.

The city is now developing two off-street parking lots and and is planning to equip them with two-hour parking meters. (Reported by H. J. Hoose, Traffic Engineer)

WINSTON-SALEM, NORTH CAROLINA (Pop. 80,000)

Winston-Salem may become the fourth city in the country to own and operate a parking building, if the Council approves Mayor Marshall Kurfees' suggestion. The city has received a $60,000-a-year gross income from parking meters installed in 1947 and the Mayor believes the building could be financed from these revenues. City attorneys cited a provision in an act of the 1947 legislature in advising the city that construction of such a building would be legal. G. S. 160-200 (31) authorizes cities to use the revenues from parking meters "for the . . . . purpose of providing buildings, spaces and lots for the parking of motor vehicles otherwise than on the public streets, and for the expenses incurred in the regulation of such off-street parking." (Reported by Institute of Government, University of North Carolina, in POPULAR GOVERNMENT)

CINCINNATI, OHIO (Pop. 480,000)

The 1949 Legislature empowered cities to procure land, through condemnation or otherwise, for parking facilities and to operate or lease lots or garages.

Part of the land being held by the city for future construction of the distributor section of the expressway system is being leased for parking. The amount devoted to this purpose is currently being increased. Further purchases of land will be made with an eye to consolidating holdings into units large enough to provide additional parking facilities adjacent to the central business district.

An offer also has been made to parking lot and garage operators to use the city's power of condemnation to extend existing facilities or to assemble parcels of land for new parking projects.

The Parking Garage Association is dealing with retail merchant groups in what may lead to a contractual relationship which will encourage shopper parking through lower attractive rates to shoppers who have parking tickets validated. This group also is planning an advertising program to acquaint the public as to location of available off-street facilities and the most advantageous time when these facilities are not being used to capacity. (Reported by George W. Howie, Traffic Engineer)

CLEVELAND, OHIO (Pop. 879,000)

Cleveland has two large fringe parking lots, each approximately two-thirds of a mile from the middle of the central business district. North of the central business district on the lake front is a municipal parking lot of three thousand car capacity where free parking is permitted with a six cent bus fare downtown. This facility has been in operation since 1942. Within the last few months another lot of twelve hundred car capacity has been opened east of the downtown area under private ownership with a twenty-five cents daily fee being charged. This parking lot is also served by a loop bus with six cents fare.

In spite of these two parking areas and supplementary facilities, parking demands in Cleveland greatly exceeds available supply. For this reason a parking survey was conducted in the fall of 1947 and spring of 1948 under the co-sponsorship of the Bureau of Public Roads, the Ohio Department of Highways and the City of Cleveland. At the present time, analysts are in the midst of summarizing the data and preparing the final report. Parking inventory as of the fall of 1947 indicated Cleveland to have a total of 27,118 parking spaces in the central business district with 2,742 curb spaces, and off-street lots and garages with a total parking capacity of 24,376 stalls.

A major objective of the survey is the establishment of a parking authority for coordination of all parking interests and formulation of an action program. In the November 1949 election a bond issue of one million dollars was proposed to the electorate to assist the merchants of neighborhood shopping centers in financing the development of off-street parking facilities. Because 57 per cent of the voters authorized the bond issue, and there is some question now before the Ohio State Supreme Court as to whether a recent law reducing the required majority for such city issues from 65 per cent to 55 per cent was effective as of that election, the City of Cleveland does not yet have this money at its disposal for improving parking in the neighborhood centers. While there is no set formula of City participation in the neighborhood parking lots, it is

expected that these funds will be used for acquisition of property with the merchants generally being responsible for developing the parking areas.

With action that is anticipated upon the parking survey and the availability of money for financing parking improvements in the neighborhood shopping centers, Cleveland's administration gives real promise of attacking its parking problem in a most constructive manner. (Reported by William E. Billings, Cleveland Automobile Club)

PORTLAND, OREGON (Pop. 305,000)

An enabling act, defeated in the 1947 Legislature, was passed during the 1949 session which will permit cities to finance off-street parking through various methods, including general taxation, district assessments, or utility certificates.

A Traffic and Transportation Commission has been created and is studying off-street parking problems.

An initial installation of an automatic parking device will probably be made soon in this city. This device, as planned by Mr. Leo Sanders of Northport, Washington, and manufactured by The Peters Company of this city, calls for a prefabricated open steel structure with 7′ x 7′-6″ compartments for cars which will be four tiers high. Cars are to be handled by an automatic elevator traveling on rails and operated by an operator who rides the elevator. Cars are moved into and out of car spaces by hydraulic apparatus. Approximately one minute is taken in placing the car in position and returning to starting point.

The low cost (about $300.00 per car space) and the fact that it can be removed from the site without loss make it an ideal temporary solution of the off-street parking problem. (Reported by F. T. Fowler, Traffic Engineer)

ALLENTOWN, PENNSYLVANIA (Pop. 97,000)

The chain of parking lots developed by Allentown's merchants in cooperation with the Call-Chronicle newspapers has rounded into a substantial community asset. Ten parking lots, all operated on a uniform basis, encircle the T-shaped shopping center of Allentown. Shoppers parking on a lot pay a 25-cent fee for two hours and have the money refunded to them when they return from the store with their ticket validated by any of the sixty Allentown merchants, now members of Park & Shop, Inc.

The lots have a capacity of 800 car spaces and eventually will be expanded to 1000 car spaces through the razing of outworn buildings on land now owned by Park & Shop.

The sixty merchants have invested $300,000 in common stock in the company, and land and buildings owned by the company total $440,000. The company reports modest earnings with excellent prospects for the future.

The Allentown plan proposes the continuance of a 25-cent rate for two hours' parking, with five cents an hour being charged after the first two hours in order that shoppers from the trading area of 336,000 will find it convenient to park and shop in Allentown at low cost. When the parking tickets are validated at the stores, parking is actually free, with the various stores picking up the tab.

All lots acquired by Park & Shop are located within 1000 feet walking distance of Allentown's central city shopping area.

Shoppers' parking organizations in Wilmington, Delaware, Chambersburg, Pa., Uniontown, Pa., and Lancaster, Pa., are following the pattern set by Park & Shop, Inc., in Allentown. The name "Park & Shop" is being made available to any community group that provides ticket validation by stores with a nominal lease at $1.00 a year for the use of the name. Lancaster, Pa., Chamber of Commerce will be the first city to set this up with its "Park & Shop in Lancaster, Inc." (Reported by Donald P. Miller, Secretary, Park & Shop)

PHILADELPHIA, PENNSYLVANIA (Pop. 1,931,000)

In July of 1949, 770 parking meters were installed and placed in operation in the Germantown Business District of Philadelphia. These are the first for Philadelphia. These meters have proved so successful that meter use will probably be extended to other suburban districts, ultimately bringing the total to about 4,000 meters.

The off-street parking program is gradually developing. The State Legislature has granted the authority to create an off-street parking authority and an ordinance was introduced into City Council to create the Philadelphia Parking Authority. The Philadelphia Highway Traffic Board is pressing for the passage of this ordinance and has appointed a special committee to try to get the ordinance out for a public hearing. (Reported by Robert A. Mitchell, Chief, Bureau of Traffic Engineering)

PROVIDENCE, RHODE ISLAND (Pop. 253,000)

Parking meters have been returned to the streets of Providence after having been in storage for nearly ten years. Approximately 1000 meters are now covering the downtown area.

During the 1949 session of the General Assembly, an off-street parking bill was passed. The bill gives the city authority to plan for and build off-street parking facilities. The facilities are to be operated by private operators leasing the facilities from the city. Only if there are no private interests willing to operate the facilities will the city take over this operation. (Reported by Roger T. Chandler, Assistant Traffic Engineer)

DALLAS, TEXAS (Pop. 294,000)

The City Administration continues to advocate that off-street parking facilities should be provided by private enterprise rather than by any municipal action. A bill before the State Legislature in 1947 providing for the establishment of municipal "Traffic Authorities" was defeated and no attempt made to introduce the bill in 1949.

New downtown parking facilities include the Mercantile National Bank, which will have four floors for underground parking of 900 automobiles and a ground floor and two upper floors for offices. (Reported by W. C. Brandes, Former Traffic Engineer)

NORFOLK, VIRGINIA (Pop. 144,000)

A plan for establishing off-street parking facilities is gathering momentum rapidly. A Downtown Businessmen's Association comprised of merchants, business and professional men has been formed. The objective of this

association is to gather all information relative to the parking problem in the downtown area and to support, in every way possible, an over-all off-street parking plan for the Central Business District. The Norfolk Parking and Traffic Commission has been studying the parking problem for approximately twelve months and has prepared a tentative plan, which will be submitted to City Council early this year. (Reported by Fenton G. Jordan, Jr., Traffic Engineer)

SEATTLE, WASHINGTON (Pop. 368,000)

State enabling legislation which would authorize the creation of parking authorities has twice been defeated in the State of Washington.

The city has, however, acquired three off-street parking sites during the last two years. One unit consisted of an entire block adjacent to the new Memorial Stadium. A second unit has been acquired at the entrance of the government locks on the Lake Washington Ship Canal to accommodate 120 cars. A third site consisting of 70 per cent of a block adjacent to the Civic Auditorium has been acquired and will accommodate 280 cars.

Two of the three lots are leased to private operators with approximately three-fourths of the income reverting to the city. (Reported by J. W. A. Bollong, Traffic Engineer)

BLUEFIELD, WEST VIRGINIA (Pop. 21,000)

As reported last year, the City of Bluefield constructed an 800-car three-story parking garage, primarily through self-liquidating revenue bonds. To date the building is providing ample revenues for retiring bonded indebtedness with a comfortable margin. (Reported by Pearle A. Brammer, Secretary-Manager, Bluefield Automobile Club)

APPLETON, WISCONSIN (Pop. 28,000)

Parking has been prohibited in the four municipal parking areas between 1:00 and 5:00 A.M. Parking of trucks over 6,000 pounds has been prohibited at all times. On two lots a 2½-hour limit will be enforced for all cars during business hours. (Reported in "The Municipality", a publication of the Wisconsin League of Municipalities)

Test Stretches Built to Find Traffic's Effect on Highway

New Jersey is undertaking its own practical research to find out what kind of highway actually stands up best under today's traffic needs.

In reconstructing an existing road between Jersey City and Camden, in which many slabs have cracked, the state will lay down six new 3-4 mile stretches, each with a different formula. Some will be reinforced concrete, some of bituminous, some of unreinforced concrete.

Significant cost, as well as service, factors may be involved.

Reference Notes

By City Planning Board
St Paul, Minnesota

What Is City Planning?

Many definitions have been written by very able people.

Some consider it the designing of spectacular effects.

Some, the correction of mistakes or remedying defects due to lack of planning.

Some, that it is municipal engineering to which something has been added.

"City Planning means getting ready for the future in city growth, guiding into proper channels the community impulses." *George McAneny, former Comptroller, New York City.*

"The problem of city planning, as of chess, is to improve the situation by, as far as may be, turning its very difficulties into opportunities. Results thus obtained are both more economical and more interesting, even aesthetically, than those that are achieved by clearing the board and resetting all the pieces." *Patrick Geddes, Author.*

"City planning subjects are streets, parks, public reservations, sites for public buildings, harbor lines, location for transportation facilities and zoning regulations. When these are stamped by law on the land, there you have the City Plan." *Edward M. Bassett, Attorney, New York City.*

"City Planning is the exercise of such foresight as will promote the orderly and sightly development of a city and its environs." *Nelson P. Lewis, former City Engineer of New York City.*

"Whenever in any locality a sufficient concentration of population has occurred to create complexity, here will be found a network of interests each seeking its expression in the physical life of that locality. City Planning, by prevention or cure, should bring these interests into harmony." *Frank B. Williams, Attorney, New York.*

"City Planning is a science, an art, and a movement of policy concerned with the shaping and guiding of the physical growth and arrangement of cities in harmony with their social and economic needs." *Thomas Adams, Massachusetts Institute of Technology.*

"I think the existence of plans known to everybody will give just enough direction to the movement of the multiplicity of separate impulses to lead the growth of the city along the right lines." *Elihu Root, Attorney.*

"We can think of our community as we think of an apartment which we are planning to build. Where are we going to put the piano? How are we to keep the different members of the family from stepping on one another? A city is simply a larger and more complicated apartment and its inhabitants a more numerous family." *R. L. Duffus* in *"Mastering a Metropolis."*

Open Discussion

Highway Delineators

At the same time we published the diagrammatic sketch and description of a proposed highway delineator under "Open Discussion" in the January issue, the Armor-Flex Company was mailing a special questionnaire to key state traffic engineers. We are listing herein a digest of comments received. Since the company indicated that replies would be treated confidentially, we have made no attempt to identify the source.—ED.

Q. 1. Keeping in mind the usual markings for curves and winding roads, do you think there is a need for some such device to give better control and direction?

A. It would not be correct to say that there is a "need" for highway delineators. On the other hand, there is no question but that the delineation of a pavement by means of reflecting devices is helpful to motorists travelling at night.

Q. 2. If you agree that there is a need of better markings for curves and winding roads, should this delineator be used;

(a) To supplement present markers, or
(b) Replace present markers.

A. Until such time that a new device has proven beyond doubt that it alone is sufficient to guide traffic around curves or turns, it should be used to supplement present markers.

Q. 3. What is your opinion as to "driver reaction" to such a device?

A. Thinking of curve delineation in general I believe such treatment would find favorable reaction on the part of the majority of motorists.

Q. 4. Will the positioning of the delineator head to indicate the sharpness of the curve be generally and readily understood by drivers? Or will it be necessary to add an additional marker (as is often the present practice) to indicate safe speeds—M. P. H.

A. I do not believe that the positioning of the delineator head to indicate the degree of curvature will be understood by drivers without a long educational program. It is my opinion that the standard Warning sign with the proper arrow to indicate the degree of curvature, together with the Advisory Speed sign, should not be replaced by any type of road delineator as a means of indicating safe speeds on curves.

Q. 5. Is the fact that this delineator is so built as to be almost vandal-proof, a factor in its favor? (This is mentioned because of the considerable loss of delineator buttons from past installations.)

A. A delineator which can be so built as to be almost vandal proof would certainly be welcome. One of our greatest problems is the terrific maintenance necessary to properly maintain our present delineators, due to vandalism, etc.

Q. 6. Would you wish to observe a test section of these delineators before reaching a conclusion?

A. An observation of a test section would be helpful; however, tested and proven field experience would be conclusive.

Q. 7. Would the general use of such delineators make a worthwhile reduction in accidents and add to the driving comfort of the travelling public?

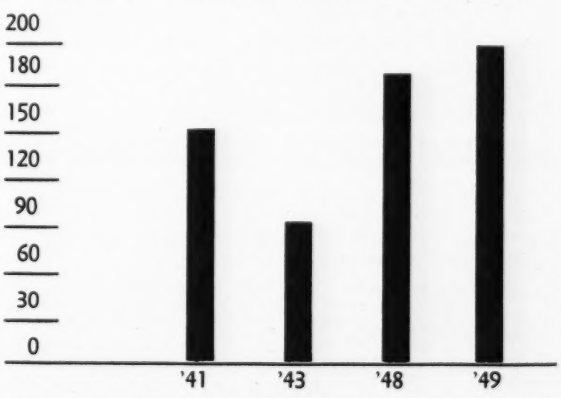
A. In general, delineation should reduce accidents such as the driving-off-road type. Accident records are as yet not available for a period long enough to make a comparable analysis of the trend in this direction. Delineation definitely adds to the driving comfort of the travelling public, however.

Q. 8. Should the "very sharp curve" position of the delineator head be made with a red reflective head so as to call attention to a dangerous curve?

A. Under no conditions should red reflectors be used as delineators. Our experience indicates that there is a possibility that a motorist may take a red delineator to be the taillight of a car which he is following.

Traffic Trends

VEHICLE — MILES OF TRAVEL — BILLIONS



TRAVEL ON RURAL ROADS FOR FIRST ELEVEN MONTHS OF 1941, 1943, 1948 AND 1949.

Based on Public Roads Administration Data

POSITION AVAILABLE

TRAFFIC ENGINEER

City of Saginaw, Michigan

Salary: $4740 to $5220 per year.

Vacancy: Public Works Department.

Last Date of Filing Application: February 15, 1950.*

Date of Examination: To be announced.

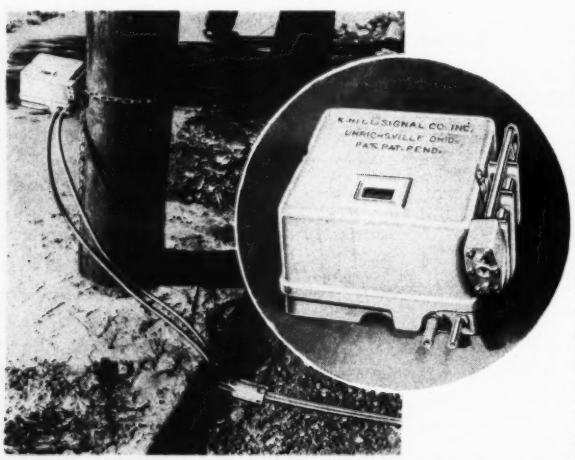
(Open to any citizen of the United States having necessary qualifications).

Requirements of Work: Ability to conduct a traffic engineering study; ability to prepare reports on traffic problems; ability to analyze the results of a traffic engineering study; ability to arrive at working solutions of traffic and transportation problems; knowledge of methods used in determining traffic flow, speed and hazards; ability to work with other departments; ability to anticipate future traffic needs, and to cooperate in providing plans covering them; familiarity with traffic control devices such as signs and signals.

Desirable Experience and Training: Possession of appropriate engineering degree from a recognized college or university and two years experience in traffic engineering, or any equivalent combination of education or experience.

APPLY: Personnel Advisory Board, Room 203, City Hall, Saginaw, Michigan.

**It may be necessary to extend the final date of the applications, and any application received after this date will be given consideration.*



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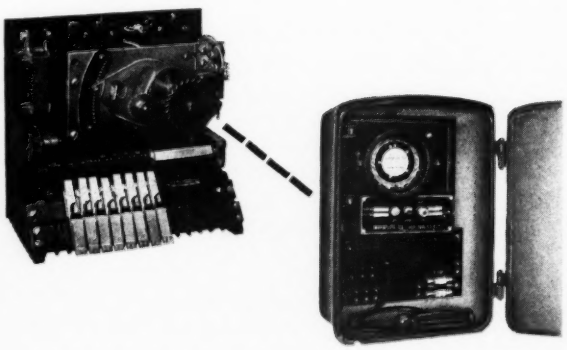

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Hundreds of big cities including New York, Philadelphia and Los Angeles, and thousands of smaller ones from the Empire State to the Golden Gate, are now enjoying trouble-free service from their Marbelite Traffic Control Equipment. And no wonder – Marbelite manufactures traffic signals and controllers *exclusively*. For the facts on how Marbelite can best serve your needs, send coupon today.

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TRAFFIC NEWS

Europe's Highway Transport Due for Big Expansion

To move into the fields where policy is made rather than stay where one learns only of its end-products is the aim of every ambitious transport administrator. We therefore publish a typical pre-view of policy in its formative stage. Here is the resolution of the Highway Transport Committee of the International Chamber of Commerce, as prepared for the recent Conference at Quebec. Action in this sense by all appropriate national bodies is now recommended.

European highway transport organized on a sufficient broad basis and efficiently utilised would be of great assistance in the European Recovery Programme which, to be effective, must include a plan of procurement and distribution that will ensure the expeditious and economical handling, movement and use of all equipment and materials to be provided under the Foreign Assistance Act.

The International Chamber of Commerce, therefore, recommends:

1. That maximum use be made of highway transport in Europe. This presupposes finding means of ending the shortage of automobiles, buses and coaches which most of the countries of Western Europe are experiencing at the present time, by increasing the Coefficient of production and by carefully avoiding waste of man-power and of the spare parts rendered indispensable by the advanced age of the vehicles in service.

2. That measures be taken to reduce and where possible to eliminate discrimination in any shape or form and, in particular, that credits be allocated to the different forms of transport as required in the general interest with due regard to the contribution highway transport can make towards European recovery.

3. That to this end a careful determination be made in each country of the factors that now impede the progress of highway transport and that appropriate action be taken to eliminate such barriers, particularly shortage of fuel, a point which the I.C.C. emphatically stresses.

4. That due provision be made for the efficient utilisation and maintenance of the vehicles which it has been estimated will be required for the operation of the European Recovery Programme.

5. That the recipients of aid under the European Recovery Programme should be given the possibility of utilising, for the solution of their highway problems, the technical experience of the experts and qualified persons of all countries in which highway transport has already reached a high degree of development.

6. That the personnel of the Administrations implementing the Programme include men experienced in the transport field in general and in the field of highway transport in particular.

7. That close contact be maintained between these Administrations and private international organisations dealing with highway matters, with a view to arriving at a fruitful exchange of experiences in this field.

—Transport Management

First Pennsylvania Traffic Engineering Conference

A three-day traffic engineering conference will be conducted on the Penn State campus in State College, Pa., on March 29, 30, and 31, 1950. Penn State officials have extended invitations to all persons interested in the program.

The conference is designed especially for traffic engineers, municipal engineers, state highway engineers, police officers and others interested in safe, efficient traffic flow.

Prominent traffic engineers of the eastern United States will head the list of speakers.

The conference program will be highlighted by discussions of traffic regulations, traffic studies, and traffic design and planning. Practical approaches to common traffic problems will be outlined during conference sessions.

Departments of The Pennsylvania State College cooperating in the program presentation are Civil Engineering, Institute of Local Government, and the Institute of Public Safety.

Additional conference information may be obtained by writing to the Course Co-ordinator, Institute of Public Safety, The Pennsylvania State College, Pa.

"The only way to solve the traffic problems of this country is to pass a law that only paid-for cars are allowed to use the highways. That would make traffic so scarce we could use our Boulevards for children's play grounds."

WILL ROGERS
January 6, 1924

PERSONAL ITEMS

Eugene Barton, long out of circulation, reports that he is currently serving as Technical Advisor to the Governor's Citizens' Traffic Safety Commission of Maryland. Gene reports the consulting business is somewhat on the decline in the Baltimore area . . . **"Bernie" Hartung** hints that there will be a change of locale within the next year, possibly San Diego or some larger Pacific Coast city. He hopes this will provide more opportunity to become active with the Westernite group . . . **Major Ralph Pastor** has become the "travelling salesman" for the Continental Air Command based at Mitchell Field, Long Island. Ralph reports considerable activity in matters pertaining to ground transportation at air-force terminals . . . **Ted Forbes** is leaving the Hawaiian Islands "on leave" for a year of research study for the Institute of Transportation and Traffic Engineering, UCLA branch . . . **Gordon Gravelle** assisted the city of Albuerque in their purchase of traffic signals . . . **Major Steve Butterfield** came back to the States in January for a new assignment in Washington, D. C. Steve has been overseas for "many moons" . . . **John Caarls** is struggling with the loading and unloading problems in the downtown business area of Tucson **Ed Wetzel** is still "busy as a bee" planning the 1950 Annual Convention. He has already gone on record that New York will "outdo" the Washington meeting . . . **Ken Vaughan-Birch** has installed a 4-way STOP interval in traffic signals at a Vancouver intersection . . . **Arch Bollong** and **Fred Fowler** took advantage of the ITE Annual Meeting in Washington to go on a "cook's tour" of the USA . . . It appears that **Ross Harger** and **Joe Wehmeyer** had an uncomfortable time at a recent Ann Arbor football game attempting to occupy the same seat . . . **"Teke" Wiley** and **Charles Michalski** are keeping up the "publicity front" with their electronic tests with the radar speed meter in downtown New York City . . . **Al Hutchison** is teaching traffic engineering in his spare time at UCLA . . . **Fred Bell** took part in the peace officer's short course offered by the University of Iowa recently. He instructed the advanced class in the use of accident records . . . **Harry Howard** quite pleased to report that his "pet project" (a full-time survey and planning assignment) in his former position with the Florida State Road Department is now in preparation of construction. We have reference to the $42,000,000 expressway to be built in Duval County designed to expedite traffic through his new bailiwick—Jacksonville.

Traffic University Course Suggested

At the conference of the Institute of Traffic Officers, held recently in Durban, South Africa, Brigadier A. A. HAYTON (Affil., ITE), Chief Traffic Officer of Johannesburg, said that the day of simply putting a man into uniform and sending him out to catch as many traffic offenders as possible was past.

"I visualize a course on traffic being established in the universities, and there is no reason why the science of traffic should not be regarded as being as important as any of the other known sciences," he said.

A uniform traffic ordinance for the whole country was being drawn up. He advocated that accident bureaus should be established to investigate the cause of accidents.

Paved streets were first tried out in Rome 2,000 years ago when an emperor recognized the need for efficient transportation facilities.

Swain Boosts Traffic Engineering In Europe

The need for traffic engineers in the United Kingdom was stressed at a meeting held in London recently under the auspices of the British Royal Federation, International Road Federation and the Road Traffic Study Group. The meeting heard a paper read by Mr. R. O. Swain (Assoc. Mem., ITE), Executive Director of the IRF American Region, on "The Objectives and Place in the Community of a Traffic Engineer in the U. S. A.

In his paper Mr. Swain said that traffic engineering had become a highly scientific profession principally because the problems of roads and streets today were concerned more with movement than with the actual road bed.

From the discussion which followed the reading of the paper, it was obvious that the majority of those present were of the opinion that the time was now opportune to have trained personnel in the United Kingdom to collect traffic statistics so that future road development schemes could be properly planned in the light of traffic requirements.

Mr. J. S. Killick, C.B.E., M. Inst. C. E., president of the Institution of Highway Engineers, United Kingdom, suggested that an *ad hoc* committee be formed of interested parties to consider the whole subject of traffic engineering in relation to this country.

Mr. Swain was visiting London to attend the first annual general meeting of the International Road Federation (European and Eastern Region). During their stay in Britain overseas delegates inspected a few typical British roads. They devoted some time to observing the flow of traffic along the Winchester By-pass, one of the most recently built roads in Britain.

The delegates included representatives of Road Federation in Belgium, East Africa, France, India, Netherlands, Sweden and Switzerland.

Those present from the United Kingdom included members of the three organizations concerned, the Automobile Association and the Royal Automobile Club, highway engineers, the police and prominent personalities interested in roads.

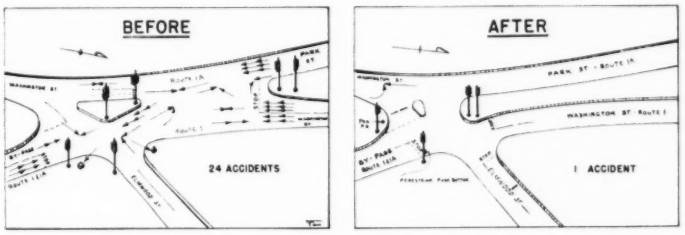
GETTING RESULTS

THROUGH TRAFFIC ENGINEERING

No. 6

TRAFFIC SITUATION No. 6
IMPROVED ISLANDS AND SIGNALS REDUCE ACCIDENTS

PROBLEM—In North Attleborough, Massachusetts, the junction of Washington Street (Route 1 North), the By-Pass around the business area, Park Street (Route 1A), and Elmwood Street, although signalized, was the location of many collisions.



ACCIDENT FACTS—In 62 months there were 22 accidents with 42 injuries. The accidents were about evenly divided between daylight and darkness, and fourteen were of the rear-end type.

FIELD STUDIES—Field observations indicated that the accident record could be attributed to the large pavement area, approximately 105 feet by 190 feet, poor channelizing facilities, and turning movements at several locations within the intersection. Volume counts revealed that about 12,000 vehicles passed through this intersection daily. Route 1 (Washington Street North and 1 - 1A South) carried approximately 8,000 vehicles, while the other three approaches combined carried the remaining 4,000 vehicles (Washington Street South, Park Street North and Elmwood Street East). The largest left turning movement, 3102 vehicles, was from Washington Street (North) into Route 1 - 1A (South).

SOLUTION—The open area of the intersection proper was reduced by extending a peninsula between Park Street and the north leg of Washington Street, thus confining all turning and cross-movements to a small area opposite Elmwood Street. Traffic actuated signals with a simple layout supplanted the original complicated system of pre-timed signals. These improvements cost approximately $5,100, including signal changes.

CHECK BACK—After 34 months following the change, only one accident was reported, and that collision was outside the limits of the intersection on a minor approach. This improvement is probably attributable to definite channelization and to the fact that motorists are now reasonably sure of the paths of vehicles in opposing movements.

Example Contributed By
Edgar F. Copell, Traffic Engineer
Department of Public Works
Commonwealth of Massachusetts
100 Nashua Street, Boston, Mass.

This is the fourth in a continuing series of reproductions of selected "Getting Results" examples, published through the courtesy of the Accident Prevention Department, Association of Casualty & Surety Companies.

"Traffic Engineering" In Microfilm

"Traffic Engineering" magazine entered into an agreement with University Microfilms, Ann Arbor, Mich., to make available to libraries volumes of the magazine in microfilm form.

One of the most pressing problems facing all types of libraries today is that of providing adequate space for a constant flood of publications. Periodicals pose an especially difficult problem because of their bulk and number.

Microfilm makes it possible to produce and distribute copies of periodical literature on the basis of the entire volume in a single roll, in editions of 30 or more, at a cost approximately equal to the cost of binding the same material in a conventional library binding.

Under the plan, the library keeps the printed issues unbound and circulates them in that form for from two to three years, which corresponds to the period of greatest use. When the paper copies begin to wear out or are not called for frequently, they are disposed of and the microfilm is substituted.

Sales are restricted to those subscribing to "Traffic Engineering" and the film copy is only distributed at the end of the volume year.

The microfilm is in the form of positive microfilm, and is furnished on metal reels, suitably labeled. Inquiries concerning purchase should be directed to University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

Long Life
EMBOSSED TRAFFIC SIGNS

WRITE FOR CATALOG
Cataphote Corporation
TOLEDO, OHIO

Personalities . . .

EARL J. REEDER contends that traffic engineering was a "natural" for him. He was born in the great automobile producing State of Michigan and he and automobiles were youngsters at the same time. Earl says he can remember faintly the first automobile he ever saw as it chugged successfully up a little hill beside the farm where he lived in the southern part of that State.

In 1911 Earl graduated in a class of five from the high school in the rural village of Sunfield. Perhaps there is another coincidence in that he has gone from Sunfield to a "Sunshine" State.

In 1915 he graduated in Civil Engineering at Michigan State College and immediately entered the industrial accident prevention field in charge of safety engineering and compensation insurance rating for the State Accident Fund of Michigan. In 1919 he continued his industrial safety work by becoming Safety Director for the Chevrolet Motor Company at Flint, Michigan. While there he was active in and served on, several committees of the General Motors Central Safety Organization.

It was during his connection with the Chevrolet Motor Company that his Alma Mater conferred upon him the professional degree of Mechanical Engineer and he became registered in that field under the new engineering regulation law in 1921.

(See REEDER, *page 212)*

THEODORE TREMAIN McCROSKY started life in Nebraska in 1902 but never lived there. About that time, his father entered the London office of a New York engineering firm, and Ted went along to England and stayed 12 years. Since then he has been an adopted New Yorker, though often working and living elsewhere.

McCrosky took his B.S. degree in civil engineering at Yale in 1923, and

stayed on a year to teach under Charles J. Tilden (Hon. Mem., ITE). He was awarded a fellowship by the Commission for Relief in Belgium Educational Foundation, and received his Ingénieur Constructeur degree at Louvain in 1925. He returned to Charlie Tilden's bailiwick, got married, taught two years more, and worked on the side as Traffic Engineer for the Eno Foundation.

In 1927, he joined the staff of Ernest P. Goodrich (Mem., ITE) and got started on his continuing career in traffic, planning, and zoning engineering. In 1928, he was assistant to Thomas Adams, Director of Plans and Surveys of the Regional Plan of New York and Its Environs. He was co-author of *Population, Land Values and Government.*

Goodrich sent him to China in 1929 as resident engineer on the preparation of the Plan of Nanking as the new capital city. Ted says it was a first-class plan, but after he left the Japs knocked out the capital budget set-up for carrying it out. He had trouble with the water buffalo, when trying to solve a public health problem. These beasts of burden soak themselves in mosquito-breeding ponds. No ponds; no mosquitoes; but also no buffalo. The Chinese decided to keep the ponds, keep the buffalo and keep the mosquitoes. Ted managed to get home without catching malaria.

From 1931 to 1938 McCrosky served as Planning Director of the City of Yonkers, N. Y.; and the latter half of that period was also a member and Acting Director of the Yonkers Municipal Housing Authority, and consultant to the Mayor's Committee on City Planning in New York City. In the latter capacity, he advised on the first extensive studies for revision of the New York Zoning Resolution, including development of the "floor area ratio" principle.

After spending the first half of 1938 as a peripatetic Project Adviser for the U. S. Housing Authority, Ted settled down in New York as Director of Planning in the Department of City Planning, City of New York. The first component parts of the Master Plan, including express highways, areas suitable for clearance and low rent housing, and a tentative land use plan, took shape under his immediate direction.

McCrosky was called to Chicago in January 1941 as Executive Director of the Chicago Plan Commission. He built up an expanded staff and program, completed a series of basic planning studies, and got the work of preparing a new Master Plan well under way. A great many of the best men and women on his staff drifted off to the Armed Services, and Ted followed them away in January of 1943.

He served three years in the Office of the Chief of Naval Operations, most of the time as head of the Field Liaison Section, Base Maintenance Division. It was part of his duty to find out what the commanding officers of newly established advanced bases were swearing about, so that the next new base could be planned to take the curse off. He also wrote several training manuals for shore-based Naval personnel. Ted ended up with three stripes and a personal commendation.

In 1945, the State Department borrowed him from the Navy, to serve as

Information Officer of the International Secretariat at UNCIO, San Francisco.

From January 1946 to July 1948, McCrosky was Executive Director of the Greater Boston Development Committee, Inc. He devoted a lot of his time to planning and pushing a program of express highways for the Boston Region. He was also co-author and editor of *Surging Cities,* a secondary school textbook on regional planning problems and solutions.

Since August 1948, Ted has been partner in the firm of McHugh and McCrosky, Community and Regional Development Consultants, with offices in New York. Among recent engagements are: comprehensive plan for Morristown, N. J.; tuning up Yonkers zoning ordinance; preparation of a study of the economic and industrial dispersion, for the National Security Resources Board; and consultant to the California Assembly Interim Committee on Tideland Reclamation and Related Traffic Problems. This work had special reference to the regional planning and traffic implications of various proposals for the next vehicular Bay Crossing between San Francisco and Oakland.

McCrosky is almost a charter member of the Institute—joining in 1931. He is also a member of the American Society of Civil Engineers and former Vice-president of the American Institute of Planners.

The McCroskys live at Peter Cooper Village, which makes it possible for Ted to adhere personally to one fundamental city planning principle—"Walk to Work." Their son John is in the class of 1953 at Yale. He inherits his parents' interest in music and the theater.

New Jersey Turnpike Appointment

Brigadier General W. W. Wanamaker who retired on November 30 after thirty-one years of active service in the Corps of Engineers, United States Army, has been appointed Executive Director of the New Jersey Turnpike Authority, it was announced recently by Paul L. Troast, Chairman of the Authority.

"In his new post General Wanamaker will direct the executive and administrative affairs of the Authority as established in decisions and policies formulated by the Turnpike Commissioners," Mr. Troast said. "General Wanamaker comes to the Turnpike Authority highly recommended by leading officials and outstanding business men with whom he has been associated on various engineering projects. His experience embraces both military and civil works."

Uniform Signing in Canada

U. S. motorists who visit Manitoba, Canada, in the near future will be less bewildered than in the past by the sight of unfamiliar road signs. In May of this year, the Province of Manitoba Highways Branch announced its decision to implement the standards of the Manual on Uniform Traffic Control Devices. Immediate action was proposed towards complete standardization of all road signs on provincial highways.

While visiting the provincial capital at Winnipeg these same motorists will be gratified to find available parking spaces on the main downtown streets. Here 300-odd parking meters are to be installed this year on a trial basis, preparatory to more extensive installation throughout the central business district.

Traffic Law Violators Go To School In Prague

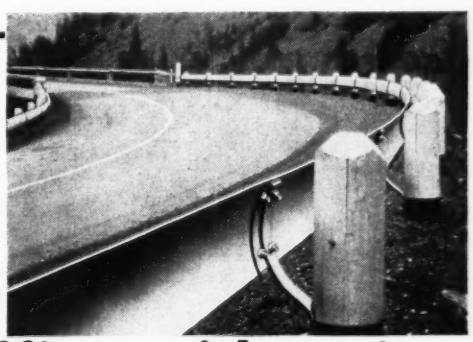
Czechoslovak pedestrians and drivers who disregard traffic regulations have been ordered to attend special Sunday courses in safety rules.

The order was issued after a "Traffic Safety Week" during which police, assisted by members of the youth front, taught people how to walk or drive over crossings in the cities. The first three days were devoted to warnings but the latter half of the week brought fines to traffic trespassers.

Henceforth a violator gets a ticket ordering him to school.

Exceeds all state safety specifications

TUTHILL HYWAY GUARD



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760 W. Polk Street, Chicago 7, Illinois

REEDER

(Continued from page 210)

In 1923 Earl joined the staff of the Engineering Extension Department, Iowa State College as Assistant Professor, and conducted Foremanship Training Courses among the industries of that State. At that time he chose between a position in Industrial Safety with the National Safety Council and one he selected, but late in 1923 when the Council offered a position in Public Safety, he accepted.

During the next 21 years, until he left the Council in February 1945 to join the staff of the U. S. Engineer Department at Oak Ridge, Tenn., Earl was identified with many phases of the growing profession of Traffic Engineering. These included traffic engineering studies in more than fifty cities, including all parts of Continental United States and Honolulu, and a traffic survey of Vancouver, B. C. These cities ranged in size from Tucson, Arizona, to Cleveland, Ohio. While these dealt with traffic engineering problems, a major objective in practically every case was to get the proper setup in these cities for carrying on traffic engineering work thereafter. Another objective of these studies was the development of traffic engineering methods in which contributions were made toward recognized procedures now in general use.

Earl was in charge of the Public Safety Program at Oak Ridge, Tenn., and served as a consultant on public safety to other areas in the Manhattan District Project from February 15, 1945, until he resigned to become City Traffic Engineer of Miami, Florida, January 1, 1946. He is now Director of Traffic and Transportation in Miami, an expansion of the original setup to handle not only traffic engineering, but also the City's planning responsibilities in conjunction with the mass transportation program. During the period of less than four years that Earl has been with the City of Miami, traffic has increased nearly 60% and his Division has had to deal with the traffic problems of a building program which, in proportion to the population, has exceeded that of almost all cities in the country. However, Earl says that it is a real challenge and he likes it.

Throughout his 25 years in traffic engineering Earl has been keenly interested in the promotion of the growing profession of traffic engineering. He was the first Secretary of the National Safety Council's Traffic Section, which was organized in the Twenties and he held that position for more than ten years, serving with outstanding men who pioneered in the development of traffic safety as General Chairman of the Section, including Professor August Vollmer, Congressman Clifford Davis, Governor Harold G. Hoffman, and William C. Knoelk.

In 1935 Earl developed and published through the magazine Public Safety a plan for Universities and Colleges to conduct a program of in-service-training, research, and extension activities in the traffic field. It was in that year that he submitted to Northwestern University a plan for such a program concerning both traffic engineering and traffic law enforcement. Shortly after that the Northwestern University Traffic Institute was established.

Earl has been an active member of the Institute of Traffic Engineers since its organization, having served on many committees and being now in his second term as a Director. One constant objective which he has had is the maintenance of a high standard of membership qualifications and, at the same time, the expansion of membership grades to take the influence of the profession to those who are in the early stages of traffic engineering experience. In his recent promotion of the organization of the Florida Section of the Institute, of which he was the first President, he advocated the establishment of a "Local Section Affiliate" membership for persons who are engaging in actual traffic engineering work which, if continued, can qualify them for some grade of corporate membership in the Institute.

The "by-products" of Earl's work in the traffic engineering field have been many. They have included speeches, articles, pamphlets, and radio broadcasts. He has been a member of the Joint Committee on Uniform Traffic Control Devices, a contributing editor to the first edition of the Traffic Engineering Handbook and a member of the Review Committee of the Second Edition that is now in process.

Earl says that one of the very satisfying things about his present position is that, quite in contrast with his earlier work with many cities throughout the country, he now stays long enough in one place to live with his traffic plans and actually see how they work. He says that, interestingly enough, many of the things that he recommended to traffic engineers and other public officials in other cities, *actually work* in Miami.

LOOKING AHEAD

March 6-9, 1950—CINCINNATI, OHIO

American Road Builders Association. 47th Annual Meeting. Netherland Plaza Hotel. Engineer-Director, ARBA, International Building, Washington 4, D. C.

March 9, 1950 — WASHINGTON, D. C.

National Committee for Traffic Safety. Annual Meeting. Hotel Statler, Washington, D. C. Executive Director, Room 960, 20 North Wacker Drive, Chicago 6, Illinois.

March 28-31, 1950—NEW YORK CITY

Greater New York Safety Council. Annual Meeting. Executive Vice-President, Greater New York Safety Council, 60 East 42nd Street, New York City 17.

March 29-31, 1950 — STATE COLLEGE, PENNSYLVANIA

State College. First Pennsylvania Traffic Engineering Conference. Institute of Public Safety, State College, Pennsylvania.

April 26 & 27, 1950 — WASHINGTON, D. C.

Third Highway Transportation Congress. Hotel Mayflower. National Highway Users Conference, National Press Building, Washington 4, D. C.

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VOLUME-DENSITY CONTROL

For Most Efficient Handling of HIGH-VOLUME INTERSECTIONS

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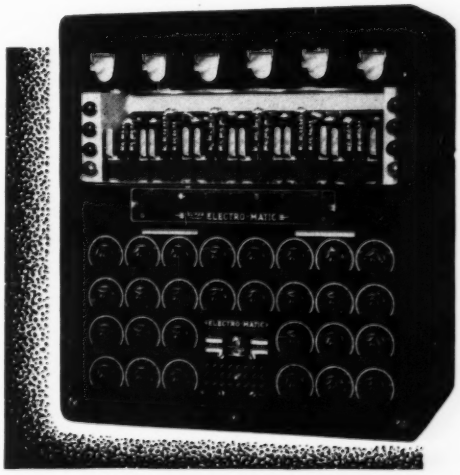
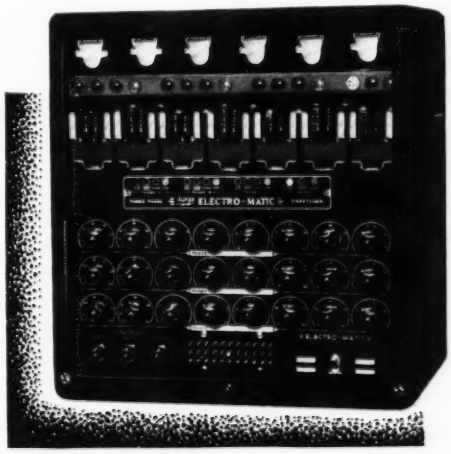


Model 1022 SUPER ELECTRO-MATIC brings 2-phase control to its highest pitch of efficiency. Volumes are "counted-in" on both phases. Density of moving traffic is measured and waiting time evaluated. Vehicle and initial intervals are continuously adjusted for best over-all operation. Needless delay is entirely eliminated. Its "platoon-responsive" features facilitate progressions through a series of 1022-controlled intersections, without interconnection.



For the control of difficult high-volume intersections where traffic must be handled in 3 phases, the volume-density principle of the Model 1033 SUPER ELECTRO-MATIC is of utmost importance. Each phase is controlled with maximum efficiency at all times. Any phase having no traffic is omitted from the cycle. There are built-in provisions for signalling up to three overlaps where such movements may safely be allowed.

Send for literature on 1022 and 1033 SUPER ELECTRO-MATIC units.

Automatic Signal Division
EASTERN INDUSTRIES INCORPORATED

TRAFFIC ACTUATED

NORWALK, CONNECTICUT

New Appointment

ALBERT L. FORDE was recently appointed City Traffic Engineer for Dayton, Ohio. After sixteen months as Assistant Traffic Engineer in the headquarters office of the Traffic Engineering Division of the Washington State Department of Highways, Forde resigned to accept the newly created

position. Reporting directly to the Director of Service and Buildings, Al will set up a traffic engineering organization for the City of Dayton. This organization will be on division status, equal in stature to all other functional divisions in the city government.

Al was a member of the Yale Bureau Class of 1948, previous to which time he had experience both in private industry and the Colorado State Highway Department as a Civil Engineer. He is currently in process of submitting application for membership in ITE.

Secretary's Column

From time to time, in our limited travels, we are asked the following questions by various ITE members: When are you going to pay a visit to our area? Don't you feel that the Executive Secretary should make more direct contacts with the membership? Can you plan to attend the annual meeting of our local Section? *Any* meeting of our Section?

No one is more aware of the importance of personal contacts with the membership, individually or collectively, than your Executive Secretary. We wish it were possible to visit each Local Section at least once a year. There is no better way to acquaint members with the general aims and objectives of the Institute of Traffic Engineers toward improvement of the traffic engineering profession.

A partial solution to this problem may be found in the establishment of permanent National Headquarters in a location that would afford individual members an opportunity to visit *Institute* offices and avail themselves of personal services while in the city. The Board of Direction is currently giving careful study to this problem and is desirous of moving Headquarters to a permanent location as soon as feasible.

The answers to all of these problems may be found in the current and future fiscal development of the *Institute*. There is no question but that moving National Headquarters to a permanent location would involve considerable expenditure and substantially increase budgetary expenditures. Similarly, the travel budget for your Executive Secretary would have to be increased to allow more personal contacts with the membership.

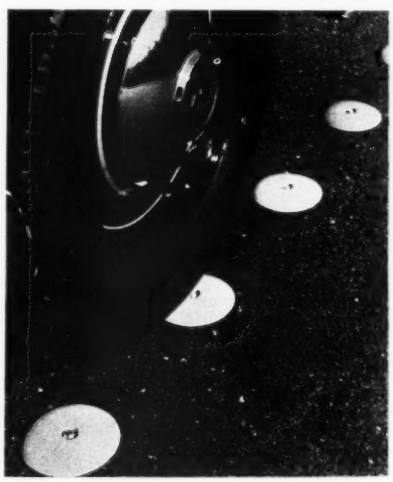
The Board of Direction is fully cognizant of these desirable attainments. However, of *first* importance is the assurance of financial stability. After three years of "contributions" the *Institute* is once again on a self-sustaining basis. The annual budget has tripled in the past three years. The planned program of expansion has resulted in many improvements and a tremendous increase in operating requirements. Some of these were enumerated in the Annual Report of your Executive Secretary published in the November and December issues of "Traffic Engineering." This first year of the return to a self-sustaining basis is a critical year. If we can operate successfully within budgetary limitations, we can then begin to "spread our wings" and seriously consider the travel requirements of the Executive Secretary and the necessity for a permanent location for National Headquarters.

The year 1950, as presently scheduled, will allow us to visit in the Middlewest area and in the "deep south". Although, infrequently, we are managing to cover most of the country, we sincerely hope that future years will provide increasing opportunities for more frequent visitations. Meanwhile, we must all put our shoulders to the wheel and maintain the pace set by our expanded program and operations in order to achieve the goals we have set forth herein.

Robert S. Holmes

New Method of Traffic Marking

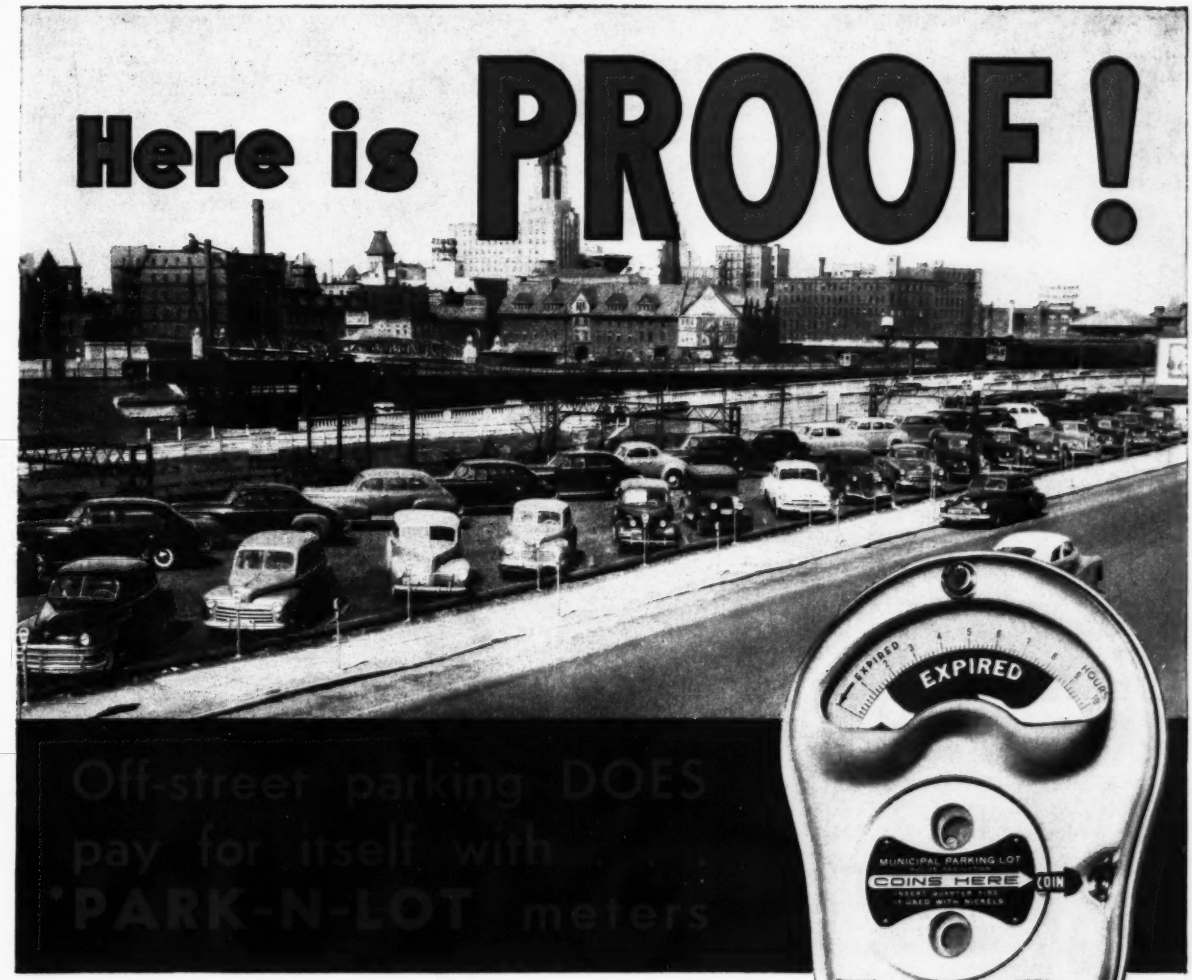
A new method of traffic marking is afforded by the development of a disk molded of tough Tenite plastic which can be applied to either asphalt or concrete surfaces with greater facility and at less cost than paint, and has far greater permanence, according to

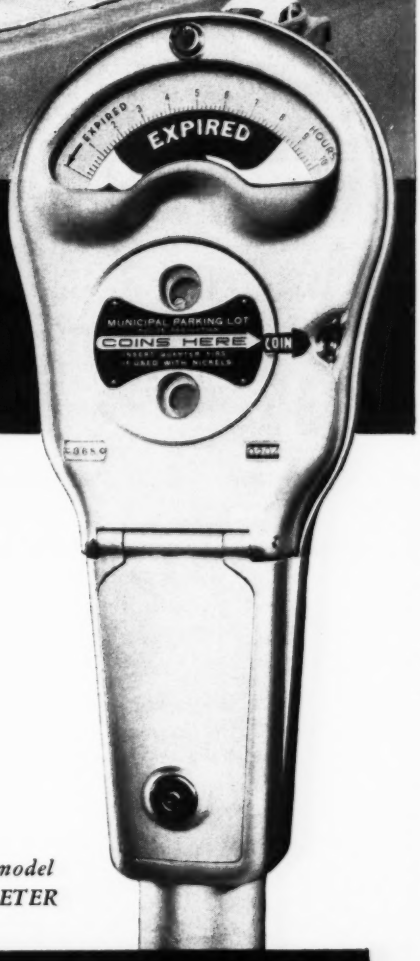


the manufacturer. The disks, known as "Dur-O-Line" traffic markers, are 4½ inches in diameter, and are furnished in either a chalk white or a bright yellow color of Tenite. Installed at regular intervals to street surfaces, the markers are said to be easily visible in all kinds of weather. The color cannot wear off or chip, and tire marks and dirt are easily cleaned from the plastic. Tenite is durable and resilient, and the markers have been found in load tests to carry fifteen times the maximum legal load limit. Weathering ability is excellent.

The markers are applied by means of special adhesive and metal pins.

Here is PROOF!





In May 1947 the city administration at Rochester, N. Y., moved to attack the off-street parking problem. A strip of land on South Avenue (see illustration) was acquired and 43 metered parking spaces installed at an average cost of $100.00 per space *including* PARK-N-LOT meters. The entire investment liquidated itself within a year.

The city now has nine off-street areas providing 531 PARK-N-LOT metered spaces, representing an average cost of $179.09 per space exclusive of land and meter costs. With average monthly revenues of $12.92 per meter for the 324 meters in the class A locations (.05 per hour) the city anticipates early liquidation of total cost and is planning extensions and further improvements . . . paid for from meter revenues.

The progressive city administration of Rochester is keeping faith with the citizens who have trusted in them as competent public servants. We congratulate them and the citizens of Rochester.

**The 10-hour model of PARK-O-METER*

Plans and basic designs for parking areas of various size and designs are available to you on request.

Mayer-Fiala
PARK-O-METER COMPANY

ROCHESTER DID IT . . . YOU CAN, TOO!

It is claimed that a two-man crew can lay a hundred of the discs in an hour, and that no traffic hold-ups ensue. Traffic may run over the markers as soon as they are installed. Shipping weight of the lightweight plastic discs is only 150 pounds per 1000 markers.

"Duro-O-Line" markers are particularly recommended for such heavy-traffic areas as intersections and pedestrian cross walks, and to separate lanes of travel and mark parking stalls. A cross walk equipped with "Dur-O-Line" markers can be seen easily two blocks away. The discs are also suitable for many commercial installations —as in garages and parking lots.

"Dur-O-Line" traffic markers are a product of Traffic Safety Supply Co., 2700 N. E. Sandy Blvd., Portland 12, Ore. They are molded by Beaman Plastic Products Co., Portland, of cellulose acetate butyrate Tenite, made by Tennessee Eastman Corp., Kingsport. Tenn.

Downtown real estate values have dropped almost 33 per cent in the last ten years, due to traffic congestion, the American Automobile Association reports.

YOURS FOR THE ASKING.....

A NEW GRANITE CURB FOLDER 7T—Containing complete specifications on fabrication and setting of Standardized Granite Curb, also detail drawing of high speed highway entrances and exits. Every traffic engineer should have it.—Write for your free copy today.

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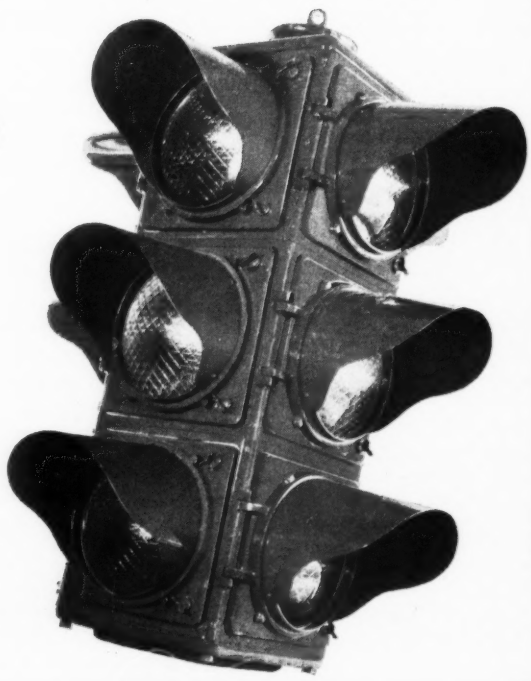

Sign up for

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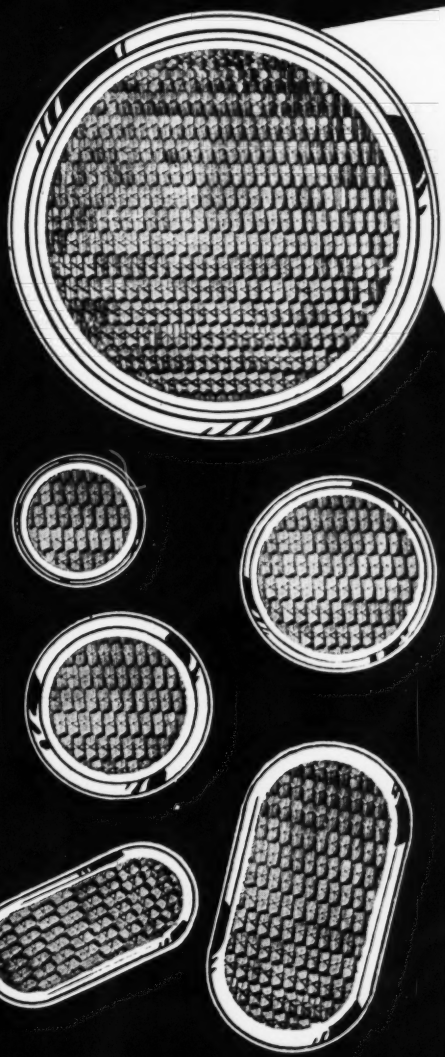

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MI-CO Parking Meters

earn more because they cost less to maintain

Oakland (California) Tribune
Tuesday, Aug. 16, 1949

Parking Meters Collect $379,063

Revenues collected from parking meters installed in Oakland amounted to $379,063 during the fiscal year ended July 31, 1949, according to a report made public today by Dudley W. Frost, manager of the Downtown Merchants Parking Association.

Frost, in a letter to D. W. Henderson, association president, pointed out that when the first meters were installed in April 1947, it was expected that they would help relieve traffic congestion, but would not raise revenue.

Frost's report, based on figures prepared by Jay Czizek, Oakland traffic engineer, who laid out and planned the meter installations, show that collection and repair costs in Oakland surprisingly have proved from 5 to 10 per cent lower than in various other metered cities.

According to a study in The American City, a national publication which surveyed meter figures in cities throughout the nation, collection and maintenance costs vary from 12 to 17 per cent of the collection return in the cities studied.

In Oakland, with collection expense amounting to $12,640 and maintenance expense running to a figure of $17,183, the $29,823 total amounts to only 7.8 per cent of the meter revenue.

It's a matter of economics. Keep operating costs down, and all other things being equal, earnings will take care of themselves. Not only in Oakland, but in every installation MI-CO Parking Meters are doing a good job. They are built to withstand punishment, and cost less to maintain because they are seldom out of order. As a result, their operating hours are more productive. Furthermore, maintenance will be just as low, and earnings just as high ten years from the time they are installed. Worth considering, isn't it? If your plans call for metered parking or the installation of additional meters, MI-CO has some very interesting figures to submit. May we send you all the facts?

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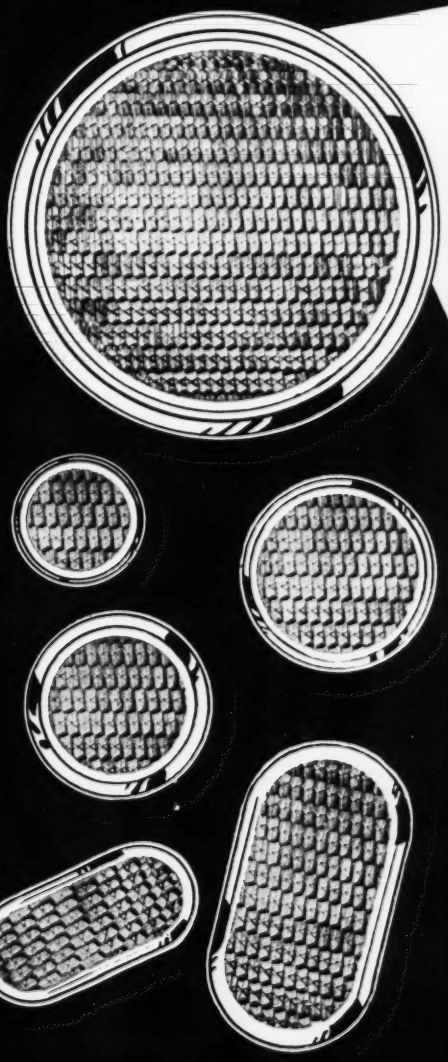

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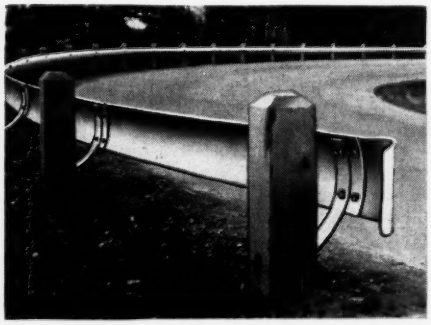

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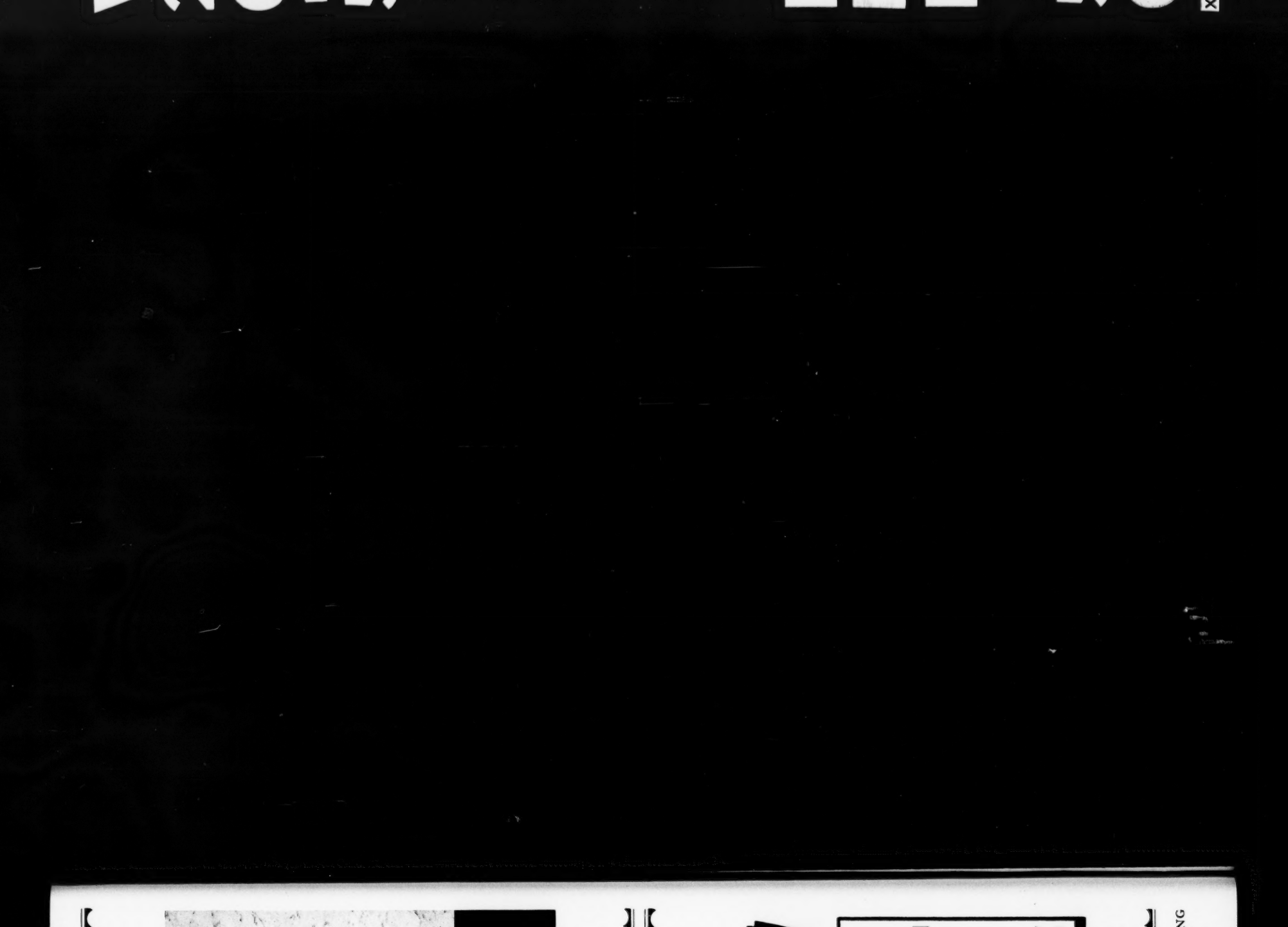
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